2013-14 Fiscal Year in Review

GREATNESS STEMS FROM IOWANS

GOVERNOR'S STEM ADVISORY COUNCIL

Scale-Up of Exemplary STEM Programs

Nine of the best preK-12 STEM education programs known were expanded throughout Iowa via regional STEM managers in 2013-14

- 3,106 classrooms and clubs engaged
- Over 100,000 Iowa youth involved
- All nine Scale-Up programs had positive effect on student interest in STEM topics and careers
- [Additional effects: see full report]

STEM-Focused Classrooms

- Four competitively awarded cost-matched grants to build model STEM classrooms
- State-of-the-art technology, connections to business and industry, and professional development in STEM teaching
- Mt. Pleasant MS, Des Moines Hoover HS, Sioux Center HS and Davenport West HS

OECD Test School Partners

Six top-performing Iowa schools took the PISA-like international test

- Decorah, Adel-DeSoto-Minburn, Ames, Cedar Rapids Washington, Pella, Cedar Rapids Kennedy
- Results calibrate Iowa on global landscape
- Results for all six schools will be announced in September

Finances $5.2M Legislative Appropriation

- 75% learner programs ($3,895,177)
- 8% Regional STEM Network ($424,260)
- 3% Public Awareness Campaign ($150,000)
- 3.1% Assessment ($160,000)
- 1.6% Conferences & Events ($83,000)
- 9.4% Operations ($487,563)

Grants Total: $1,008,000

- $400,000 for State STEM Evaluation (of a $1.2M 3-year grant from the National Science Foundation)*
- $180,000 for Noyce (of a $900K 5-year grant from NSF)
- $325,000 for Externs (of a $1.3M 4-year grant from NSF)
- $103,000 for Physics Modeling (Carver Charitable Trust)

*Executive Director Weld is PI on the grant but it is awarded through UNI to an inter-university evaluation consortium to study Iowa STEM.

Cost-Sharing Total: $3,549,689

Iowa's investment in STEM is stretched by cost-sharing partners:

- $160,000 by Strategic America
- $300,000 by Regional Hubs ($50K per institution)
- $200,000 by STEM-focused classroom partners ($50K each)
- $27,550 by business hosts for Externs
- $2,862,139 by nine Scale-Up program providers

Private Sector Investment Total: $268,500

- $100,000 MidAmerican Energy
- $50,000 for Externs (of a 2-year $100K John Deere Foundation grant)
- $47,500 from 9 donors for STEM Schools
- $20,000 Google, Inc. for Hour of Code
- $20,000 Lennox Industries
- $13,000 from 14 donors, STEM Conference
- $10,000 Verizon Foundation
- $8,000 DuPont Pioneer (USA SEF)

Major Events Included:

- STEM @ State Fair, 8-18-13
- STEM Teacher Educators' Conference, 9-20-13
- STEM @ Capitol, 2-13-14
- Statewide STEM Conference, 3-28-14
- USA Science & Engineering Festival, 4-2014

Real World Externships for Teachers

- 42 extern host businesses and agencies
- 57 secondary teachers
- 93% of teacher externs agreed Externships were more valuable than any other professional development

2013-14 Fiscal Year in Review

GREATNESS STEMS FROM IOWANS

GOVERNOR'S STEM ADVISORY COUNCIL

IT Academy

A competitive bid for IT certification programming was awarded to Microsoft in fall 2013

- 150 schools and community colleges (capacity) are enrolled
- 561 IT certifications in first six months
- A Northwest Community College IT Academy participant qualified for Nationals in Word 2010

Higher Education Network

- Community colleges, private colleges and public universities are convened monthly

Public Awareness – Strategic America

- Public relations efforts resulted in more than $850,000 in media value.
- 90 percent of the PR coverage contained at least two of our three key messages: 1) Economic development, 2) Tied efforts back to the Advisory Council/legislative funding, 3) Included a specific STEM example/story
- Nearly 600,000 billboard spots were delivered, which gave 3.4 million impressions (approx. $20,000 in donated value)
- The TV PSA was delivered 1,000+ times across 18 TV stations in Iowa

Interstate Leadership

Iowa STEM is recognized as a leader as evidenced by invited webinars, national publications, conference keynotes, etc.

- 1st Midwest STEM Forum of eleven states convened in Des Moines, June 2013
- 2nd Midwest STEM Forum convened in Moline, June 2014
- Consults provided to W. Virginia, Utah, Maryland, Indiana, Pennsylvania, Japan
- Iowa STEM leaders published A State STEM Initiative Takes Root, Blossoms in the monograph Exemplary Science Practices, NSTA Press, (Yager, ed.)

Working Groups

- Ag Science
- Computer Science
- Counselor and Parent Engagement
- STEM License (12- 2013)
- Active Learning Community
- Broadband Internet Access
- Business Engagement Toolkit
- "Seal of Approval" Protocol
- STEM Teacher Excellence Award

Communications Highlights

- 12 newsletters
- 6 regional newsletters and websites
- 126,469 total website page views
- 12,385 total organic reach on Facebook
- Added 68 users with first year LinkedIn
- 20 keynote speaking engagements at Iowa conferences, community events

Studies

- Higher Education Faculty Engagement in K-12 Outreach study, (3-2013)
- Iowa Math, Science, Technology Educator awareness study (Externships), (7-2013)
- Scale-Up Educators Persistence with Delivering Programs After Year 1 Support, (9-2013)
- Iowa College Graduates by Field Aligned to Iowa Jobs (current)

Regional STEM Network

Regional STEM Managers' contributions to statewide advancement:

- Manager Orientation Manual
- Center for Advanced Professional Studies (CAPS) Model RFP
- STEM-Focused Schools
- Scale-Up Management
- STEM Professional Development Rubric draft

Iowa STEM's manager team, collectively:

- 1200 new Scale-Up classrooms and clubs
- 257 speaking engagements
- 37 community STEM festivals
- 723 new connections with workforce, economic development and education leaders of the regions

Iowa STEM Monitoring Project

2013-2014 Summary Report

Executive Summary

Report No. 2.2

Prepared for

Iowa Governor's STEM Advisory Council

Prepared by
Erin O. Heiden, PhD, MPH
Mari Kemis, MS
Ki H. Park, PhD, MPH
Mitch Avery, MPP
Disa L. Cornish, PhD, MPH
Mary E. Losch, PhD

With assistance from
Kathleen Gillon, MEd
Matthew Whittaker, PhD
Heather Rickels
Kristin Broussard

This project involved the participation of the Governor of Iowa and the Iowa Governor's STEM Advisory Council, Grant Agreement Number, UNI-CSBR_FY2014_01.

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the Governor of Iowa, the Iowa Governor's STEM Advisory Council, or The University of Northern Iowa.

The authors would like to thank the many individuals and organizations who contributed to this report. This includes great teamwork received from a host of players at ACT, Iowa Department of Workforce Development, and the Iowa Department of Education. In addition, several students at Iowa State University, University of Iowa, and University of Northern Iowa made valuable contributions to this effort. Special thanks to Kathleen Gillon, Heather Rickels, Kristin Broussard, Brock Rozich, Stephanie Strong, Isaiah Corbin, Mizani Johnson and Letetsia Fox for providing valuable assistance. Finally, we especially thank the nearly 1,900 participants of the statewide survey, the almost 600 Scale-Up teachers and leaders, and over 21,000 Scale-Up student participants who shared their time, views, and personal experience about STEM efforts and programming in Iowa. Their generosity of time and thoughtful reflections make this report possible.

For additional information about this project, contact:
Jeffrey Weld | Executive Director
Governor's STEM Advisory Council
214 East Bartlett Hall | University of Northern Iowa
Cedar Falls, IA 50614-0298
319.273.2723 | weld@iowastem.gov
319.273.2959 | www.IowaSTEM.gov | info@IowaSTEM.gov

For additional information about this report, contact:
Mary E. Losch | Director
Center for Social and Behavioral Research | University of Northern Iowa
Cedar Falls, IA 50614-0402
319-273-2105 | www.uni.edu/csbr/ | mary.losch@uni.edu

Author Information:
Erin O. Heiden, PhD, Senior Research Scientist, Center for Social and Behavioral Research (UNI)
Mari Kemis, MS, Assistant Director, Research Institute for Studies in Education (ISU)
Ki H. Park, PhD, Senior Research Scientist, Center for Social and Behavioral Research (UNI)
Mitch Avery, MPP, Project Coordinator, Center for Social and Behavioral Research (UNI)
Disa L. Cornish, PhD, Assistant Professor, Division of Health Promotion and Education (UNI)
Mary E. Losch, PhD, Director, Center for Social and Behavioral Research (UNI)

Recommended Citation:
Heiden, E. O., Kemis, M., Park, K. H., Avery, M., Cornish, D. L., & Losch, M. E.. (2014). *Iowa STEM Monitoring Project: 2013-2014 Summary Report.* Cedar Falls, IA: University of Northern Iowa, Center for Social and Behavioral Research.

Executive Summary

The Iowa STEM Monitoring Project (ISMP) is a multi-faceted and collaborative effort that works in support of the Iowa Governor's STEM Advisory Council. ISMP partners include the University of Northern Iowa (UNI) Center for Social and Behavioral Research (CSBR), the Iowa State University (ISU) Research Institute for Studies in Education (RISE), and Iowa Testing Programs (ITP) at the University of Iowa (UI). The purpose of the ISMP is to systematically observe a series of defined metrics and sources to examine changes regarding STEM education and economic development in Iowa centered on the activities of the Iowa Governor's STEM Advisory Council. The ISMP is comprised of four components: 1) Iowa STEM Indicators System (ISIS); 2) Statewide Survey of Public Attitudes Toward STEM; 3) Statewide Student Interest Inventory; and 4) Regional Scale-Up Program Monitoring. Data for these four components come from publicly available data at the national, state, and regional levels (component 1); nearly 1,900 Iowans who participated in a statewide survey (component 2); over 21,000 student surveys from the over 100,000 students statewide who participated in a Scale-Up program (component 3 and 4), and the almost 600 Scale-Up educators who completed a teacher/leader survey (component 4).

Section 1. The Iowa STEM Indicators System (ISIS) ISIS is a system to track annual benchmarks using publicly available data on a variety of STEM topics in education and economic development by systematically assessing the progress and condition of the state's STEM landscape. ISIS includes eighteen indicators across four primary areas of focus: a) STEM achievement and interest among K-12 students, b) STEM preparation of K-12 students, c) STEM college completions, and d) STEM employment.

Select findings from the Iowa STEM Indicators System, with emphasis on changes from 2012-2013 to 2013-2014 when possible, are presented below.

<u>STEM achievement and interest among K-12 students</u>

Indicator 1: Proportions of grade 11 students that exhibited proficiency in *mathematics* and *science* increased between the 2008-2010 and 2011-2013 biennium periods (from 77% to 82% in *mathematics*, and from 83% to 85% in *science*, respectively). Increases were also observed in *mathematics* and *science* achievement across demographic groups by gender, race, ethnicity, socioeconomic status, and disability.

Indicator 2: Small gains were observed in the percent of Iowa students in 4th and 8th grades scoring at or above "proficient" in *mathematics* on the National Assessment of Educational Progress from 2011 to 2013 (net difference of +5% and +2%, respectively).

Indicator 3: The percentage of Iowa students meeting benchmarks for *science* on the ACT increased by 21% from 2012 to 2013 (from 38% in 2012 to 46% in 2013, respectively). Similar gains were also observed in the percentage of females and under-represented minorities who met benchmarks in *science*, including a 27% increase among females, 25% increase among Black/African American students, and 14% increase among Hispanic students.

Indicator 4: From 2012 to 2013, the number of students taking Advanced Placement courses in STEM-related subjects increased from 4,861 to 5,193, as well as the number of students who qualified to receive college credit from these courses (from 3,094 in 2012 to 3,352 in 2013).

Indicator 5: Interest in STEM remains high, with almost half (48% in 2012, and 49% in 2013, respectively) of students in the 2012 and 2013 ACT-tested graduating class having an expressed and/or measured interest in STEM majors or occupations.

Indicator 6: Among students who have an expressed and/or measured interest in STEM on the 2012 and 2013 ACT-tested graduating class, approximately 50-60% aspire to obtain a bachelor's degree, 10-15% a master's degree, and 25-30% a doctorate or professional degree across all subgroups by gender or race/ethnicity.

Indicator 7: In 2013, the top five majors for females with interest in STEM were in health-related fields (nursing, medicine, physical therapy), animal sciences, and biology. For males with interest in STEM, the top five majors were engineering (mechanical and general), medicine, physical therapy and computer technology.

Indicator 8: In both Year 1 and Year 2, approximately 80% of students who took the Iowa Assessments reported being interested in having a career that uses skills in science, technology, math, or engineering. This includes 40% of students who were *'very interested'*, and another 40% who reported they were *'somewhat interested'* across all grades from elementary, middle school, and into high school.

<u>STEM preparation of K-12 students</u>

Indicator 9: In Iowa, the total number of <u>licensed</u> high school teachers in STEM-subject areas decreased by approximately 12% between 2012-13 and 2013-14.

- The number of high school teachers with *initial* licenses in STEM-subject areas decreased by approximately 19%.
- The number of high school teachers with *standard* licenses in STEM-subject areas decreased by approximately 17%.
- The number of high school teachers with *master educator* licenses in STEM-subject areas did not change.

In other words, Iowa is retaining teachers in STEM-subject areas with more teaching experience and more education, and losing teachers in STEM-subjects with less experience and possibly less education.

Indicator 10: The number of teachers in Iowa with a teaching endorsement in a STEM-related area (Science, Technology, Math, Health Sciences, Agriculture) increased across the board from 2012-13 to 2013-14.

- The number of teachers who held at least one endorsement in an area of science or math increased by 13%.
- The numbers of teachers with *elementary* and *secondary* science endorsements increased by 11% and 8%, respectively.
- The number of teachers with *middle school* science endorsements more than doubled from 109 teachers to 228 teachers, an increase of 109%.

The changes in teacher licensure (Indicator 9) and teacher endorsements (Indicator 10) are noteworthy given that the number of students in Iowa remained stable between 2012-2013 and 2013-2014.

Indicator 11: Thirty-two colleges and universities are responsible for teacher preparation in the state of Iowa; this includes 29 private colleges and universities, and three Regents institutions. The three Regents institutions continue to prepare almost half of all new teachers and more than half of new teachers in STEM-subject areas.

Indicator 12: The average one-year and two-year retention rates of beginning high school STEM teachers in the state of Iowa continue to hold steady at approximately 76% and 64%, respectively. In other words, about three-quarters of new teachers who begin their careers teaching advanced high school STEM courses return for a second year of teaching advanced high school STEM courses, while one-fourth do not return after one year. In addition, two-thirds of new teachers who begin their careers teaching advanced high school STEM courses teaching at that level return for a third year, while one-third are no longer teaching after two years.

Indicator 13:

- The number of high school students enrolled in *advanced science courses* did not change between 2012-13 and 2013-14.
- The number of high school students enrolled in *advanced technology courses* and *advanced health science courses* both decreased by about 10% between 2012-13 and 2013-14.
- The number of high school students enrolled in *advanced engineering courses* increased by 13% between 2012-13 and 2013-14.
- The number of high school students enrolled in *advanced math courses* increased by 3% between 2012-13 and 2013-14

STEM college completions

Indicator 14 and 15: Minority student STEM degree completion has risen over 150% since 2009 at the community college level and to a lesser gain at the university level.

STEM employment

Indicator 16: On average in 2012, individuals in STEM occupations earned $10 more per hour and $20,000 more in annual salaries compared to all occupational groups. Specifically, STEM occupations earn $28.28 in mean wages and $58,800 in mean salaries, compared to all occupations overall earning $18.90 in mean wages and $39,300 in mean salaries, respectively.

Indicator 17: As of 2012, there were an estimated 10,000 vacancies in STEM jobs statewide.

Indicator 18: The number of individuals taking the National Career Readiness Certificate (NCRC) has increased from approximately 6,000 in 2012 to over 20,000 in 2013. In both years, approximately two-thirds qualified as STEM workforce-ready as estimated by the Applied Mathematics component.

Section 2. Statewide Survey of Public Attitudes Toward STEM To assess change in public awareness and attitudes toward STEM, a statewide public survey of Iowans was conducted from July through September 2013. A similar survey was previously conducted in 2012.

In 2013, 41% of Iowans had heard of the acronym STEM. In contrast, only 26% of Iowans had heard of the acronym in 2012. This represents a 58% increase in awareness of the acronym STEM from the beginning of Year 1 to Year 2.

Awareness and attitudes toward STEM increased significantly from 2012 to 2013, especially in the areas of economic contributions and broadening STEM participation. From 2012 to 2013, a significant gain was seen in the proportion of Iowans who '*strongly agree*' that more companies would move to Iowa if the state had a reputation for workers with good STEM skills (from 16% to 30%), increased focus on STEM education will improve the state economy (from 15% to 25%), and more should be done to increase the number of women (from 12% to 32%) and under-represented minorities (from 7% to 20%) in STEM jobs, respectively.

In addition, more Iowans see the value that STEM brings to their lives and in the opportunities and jobs available for the next generation. From 2012 to 2013, significantly more Iowans '*strongly agree*' that science and technology are making our lives better (from 40% to 50%), and that advancements in STEM will give more opportunities to the next generation (from 28% to 44%).

The majority of Iowans (86%) say there is an urgent need in Iowa for more resources to be put toward STEM education. Over half of Iowans believe hands on experiences (in elementary classrooms - 68%; with businesses - 56%; or in a lab - 53%) would make a '*major improvement*' in math and science education.

Section 3. Statewide Student Interest Inventory For the past two years, an 8-item interest inventory was added to the Iowa Assessments taken by nearly every student in 3rd through 11th grades in the state annually. The Interest Inventory was developed in part to serve as a data source for both the Iowa STEM Indicators System, and a way to compare students who participate in Scale-Up Programs with all students statewide. Among all students statewide who took the Iowa Assessments, interest in individual STEM subjects is highest among elementary students, followed by middle school and high school students, respectively. While interest in all subjects decreases as students' progress through school, the proportion of students who are *'very interested'* in pursuing a STEM career remains steady at 38-43%.

Section 4. Regional Scale-Up Program Monitoring As part of the Iowa STEM Monitoring Project, all local education agencies implementing a Scale-Up Program were asked to complete three submissions to help evaluate the Scale-Up initiative. This included: 1) a teacher/leader survey, 2) a student participant list, and 3) student surveys. Taken together, the three submissions inform the ISMP by providing the project partners with consistent information across all Scale-Up programs

In 2013-2014, Scale-Up student participants were 48% females and 52% males. The distribution of students by race/ethnicity was 80% white, 9% Hispanic, 5% Black/African American, and 6% Other. This was a small increase in the distribution of females and under-represented minorities from Year 1, which was 44% females to 56% males, and 87% White, 6% Hispanic, 3% Black, and 4% Other, respectively. The average age of student survey respondents was 11.2 years (range: 4-19 years). Elementary students (ages 4-10 years old) returned 39.5% of the total sample of questionnaires (n = 8,340), followed by middle school students (ages 11-13 years old; 37.8%, n = 7,995) and high school students (ages 14-19 years old; 22.7%, n = 4,794), respectively. Among the nine Regional Scale-Up programs offered in 2013-2014, all of the selected programs had positive effects on student interest and awareness in STEM topics and STEM careers. Among students who participated in a Scale-Up program, 9 out of 10 participants reported higher interest in at least one STEM subject or in a STEM career following Scale-Up program participation.

Teachers reported several impacts as a result of implementing Scale-Up programs in Year 2 They observed an increase in student motivation, engagement, and interest in STEM content areas as well as STEM careers. They also reported that students' critical thinking, problem solving, and teamwork skills showed improvement throughout the program. Teachers reported that Scale-Up programs allowed students to explore hands-on learning, which encouraged students to continue work on projects even after programming had ended. As a result of participating in the Scale-Up programs, over three-fourths of the teacher/leaders reported that they have more confidence to teach STEM content (80%), have increased their knowledge in STEM (83%), are better prepared to answer students' STEM-related questions (78%), and have learned effective methods for teaching in STEM-content areas (76%).

Conclusion The data compiled, collected, and synthesized for this report come from a variety of sources. Following the benchmarks established in Year 1, Year 2 showed promise in some indicators and some losses in others. The ISMP will continue to follow these indicators, identify and/or refine other metrics of STEM progress, and strengthen relationships with other data partners in the state. Taken together, this report provides a picture of Iowa's STEM landscape, and how it is evolving following the targeted initiatives of the Iowa Governor's STEM Advisory Council to improve STEM education and workforce development surrounding STEM in Iowa.

Center for Social and Behavioral Research

Iowa STEM Monitoring Project

2013-2014 Summary Report

Report No. 2.2

Prepared for

Iowa Governor's STEM Advisory Council

Prepared by
Erin O. Heiden, PhD, MPH
Mari Kemis, MS
Ki H. Park, PhD, MPH
Mitch Avery, MPP
Disa L. Cornish, PhD, MPH
Mary E. Losch, PhD

With assistance from
Kathleen Gillon, MEd
Matthew Whittaker, PhD
Heather Rickels
Kristin Broussard

This project involved the participation of the Governor of Iowa and the Iowa Governor's STEM Advisory Council, Grant Agreement Number, UNI-CSBR_FY2014_01.

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the Governor of Iowa, the Iowa Governor's STEM Advisory Council, or The University of Northern Iowa.

The authors would like to thank the many individuals and organizations who contributed to this report. This includes great teamwork received from a host of players at ACT, Iowa Department of Workforce Development, and the Iowa Department of Education. In addition, several students at Iowa State University, University of Iowa, and University of Northern Iowa made valuable contributions to this effort. Special thanks to Kathleen Gillon, Heather Rickels, Kristin Broussard, Brock Rozich, Stephanie Strong, Isaiah Corbin, Mizani Johnson and Letetsia Fox for providing valuable assistance. Finally, we especially thank the nearly 1,900 participants of the statewide survey, the almost 600 Scale-Up teachers and leaders, and over 21,000 Scale-Up student participants who shared their time, views, and personal experience about STEM efforts and programming in Iowa. Their generosity of time and thoughtful reflections make this report possible.

For additional information about this project, contact:
Jeffrey Weld | Executive Director
Governor's STEM Advisory Council
214 East Bartlett Hall | University of Northern Iowa
Cedar Falls, IA 50614-0298
319.273.2723 | weld@iowastem.gov
319.273.2959 | www.IowaSTEM.gov | info@IowaSTEM.gov

For additional information about this report, contact:
Mary E. Losch | Director
Center for Social and Behavioral Research | University of Northern Iowa
Cedar Falls, IA 50614-0402
319-273-2105 | www.uni.edu/csbr/ | mary.losch@uni.edu

Author Information:
Erin O. Heiden, PhD, Senior Research Scientist, Center for Social and Behavioral Research (UNI)
Mari Kemis, MS, Assistant Director, Research Institute for Studies in Education (ISU)
Ki H. Park, PhD, Senior Research Scientist, Center for Social and Behavioral Research (UNI)
Mitch Avery, MPP, Project Coordinator, Center for Social and Behavioral Research (UNI)
Disa L. Cornish, PhD, Assistant Professor, Division of Health Promotion and Education (UNI)
Mary E. Losch, PhD, Director, Center for Social and Behavioral Research (UNI)

Recommended Citation:
Heiden, E. O., Kemis, M., Park, K. H., Avery, M., Cornish, D. L., & Losch, M. E.. (2014). *Iowa STEM Monitoring Project: 2013-2014 Summary Report.* Cedar Falls, IA: University of Northern Iowa, Center for Social and Behavioral Research.

[Space Left Blank Intentionally]

Table of Contents

List of Tables

List of Figures

List of Acronyms

AP	Advanced Placement
AWIM	A World in Motion
BEDS	Basic Educational Data Survey
CSBR	Center for Social and Behavioral Research
GIS	Geographic Information System (maps)
ISIS	Iowa STEM Indicators System
ISMP	Iowa STEM Monitoring Project
ISU	Iowa State University
ITP	Iowa Testing Programs
IWD	Iowa Workforce Development
LEA	Local Education Agencies
NAEP	National Assessment of Educational Progress
NCES	National Center for Education Statistics
NCRC	National Career Readiness Certificate (ACT, Inc.)
NPR	National Percentile Rank
RISE	Research Institute for Studies in Education
SCED	School Codes for the Exchange of Data
STEM	Science, Technology, Engineering, Mathematics
UI	University of Iowa
UNI	University of Northern Iowa

Executive Summary

The Iowa STEM Monitoring Project (ISMP) is a multi-faceted and collaborative effort that works in support of the Iowa Governor's STEM Advisory Council. ISMP partners include the University of Northern Iowa (UNI) Center for Social and Behavioral Research (CSBR), the Iowa State University (ISU) Research Institute for Studies in Education (RISE), and Iowa Testing Programs (ITP) at the University of Iowa (UI). The purpose of the ISMP is to systematically observe a series of defined metrics and sources to examine changes regarding STEM education and economic development in Iowa centered on the activities of the Iowa Governor's STEM Advisory Council. The ISMP is comprised of four components: 1) Iowa STEM Indicators System (ISIS); 2) Statewide Survey of Public Attitudes Toward STEM; 3) Statewide Student Interest Inventory; and 4) Regional Scale-Up Program Monitoring. Data for these four components come from publicly available data at the national, state, and regional levels (component 1); nearly 1,900 Iowans who participated in a statewide survey (component 2); over 21,000 student surveys from the over 100,000 students statewide who participated in a Scale-Up program (component 3 and 4), and the almost 600 Scale-Up educators who completed a teacher/leader survey (component 4).

Section 1. The Iowa STEM Indicators System (ISIS) ISIS is a system to track annual benchmarks using publicly available data on a variety of STEM topics in education and economic development by systematically assessing the progress and condition of the state's STEM landscape. ISIS includes eighteen indicators across four primary areas of focus: a) STEM achievement and interest among K-12 students, b) STEM preparation of K-12 students, c) STEM college completions, and d) STEM employment.

Select findings from the Iowa STEM Indicators System, with emphasis on changes from 2012-2013 to 2013-2014 when possible, are presented below.

<u>STEM achievement and interest among K-12 students</u>

Indicator 1: Proportions of grade 11 students that exhibited proficiency in *mathematics* and *science* increased between the 2008-2010 and 2011-2013 biennium periods (from 77% to 82% in *mathematics*, and from 83% to 85% in *science*, respectively). Increases were also observed in *mathematics* and *science* achievement across demographic groups by gender, race, ethnicity, socioeconomic status, and disability.

Indicator 2: Small gains were observed in the percent of Iowa students in 4th and 8th grades scoring at or above "proficient" in *mathematics* on the National Assessment of Educational Progress from 2011 to 2013 (net difference of +5% and +2%, respectively).

Indicator 3: The percentage of Iowa students meeting benchmarks for *science* on the ACT increased by 21% from 2012 to 2013 (from 38% in 2012 to 46% in 2013, respectively). Similar gains were also observed in the percentage of females and under-represented minorities who met benchmarks in *science*, including a 27% increase among females, 25% increase among Black/African American students, and 14% increase among Hispanic students.

Indicator 4: From 2012 to 2013, the number of students taking Advanced Placement courses in STEM-related subjects increased from 4,861 to 5,193, as well as the number of students who qualified to receive college credit from these courses (from 3,094 in 2012 to 3,352 in 2013).

Indicator 5: Interest in STEM remains high, with almost half (48% in 2012, and 49% in 2013, respectively) of students in the 2012 and 2013 ACT-tested graduating class having an expressed and/or measured interest in STEM majors or occupations.

Indicator 6: Among students who have an expressed and/or measured interest in STEM on the 2012 and 2013 ACT-tested graduating class, approximately 50-60% aspire to obtain a bachelor's degree, 10-15% a master's degree, and 25-30% a doctorate or professional degree across all subgroups by gender or race/ethnicity.

Indicator 7: In 2013, the top five majors for females with interest in STEM were in health-related fields (nursing, medicine, physical therapy), animal sciences, and biology. For males with interest in STEM, the top five majors were engineering (mechanical and general), medicine, physical therapy and computer technology.

Indicator 8: In both Year 1 and Year 2, approximately 80% of students who took the Iowa Assessments reported being interested in having a career that uses skills in science, technology, math, or engineering. This includes 40% of students who were *'very interested'*, and another 40% who reported they were *'somewhat interested'* across all grades from elementary, middle school, and into high school.

<u>STEM preparation of K-12 students</u>

Indicator 9: In Iowa, the total number of <u>licensed</u> high school teachers in STEM-subject areas decreased by approximately 12% between 2012-13 and 2013-14.

- The number of high school teachers with *initial* licenses in STEM-subject areas decreased by approximately 19%.
- The number of high school teachers with *standard* licenses in STEM-subject areas decreased by approximately 17%.
- The number of high school teachers with *master educator* licenses in STEM-subject areas did not change.

In other words, Iowa is retaining teachers in STEM-subject areas with more teaching experience and more education, and losing teachers in STEM-subjects with less experience and possibly less education.

Indicator 10: The number of teachers in Iowa with a teaching endorsement in a STEM-related area (Science, Technology, Math, Health Sciences, Agriculture) increased across the board from 2012-13 to 2013-14.

- The number of teachers who held at least one endorsement in an area of science or math increased by 13%.
- The numbers of teachers with *elementary* and *secondary* science endorsements increased by 11% and 8%, respectively.
- The number of teachers with *middle school* science endorsements more than doubled from 109 teachers to 228 teachers, an increase of 109%.

The changes in teacher licensure (Indicator 9) and teacher endorsements (Indicator 10) are noteworthy given that the number of students in Iowa remained stable between 2012-2013 and 2013-2014.

Indicator 11: Thirty-two colleges and universities are responsible for teacher preparation in the state of Iowa; this includes 29 private colleges and universities, and three Regents institutions. The three Regents institutions continue to prepare almost half of all new teachers and more than half of new teachers in STEM-subject areas.

Indicator 12: The average one-year and two-year retention rates of beginning high school STEM teachers in the state of Iowa continue to hold steady at approximately 76% and 64%, respectively. In other words, about three-quarters of new teachers who begin their careers teaching advanced high school STEM courses return for a second year of teaching advanced high school STEM courses, while one-fourth do not return after one year. In addition, two-thirds of new teachers who begin their careers teaching advanced high school STEM courses teaching at that level return for a third year, while one-third are no longer teaching after two years.

Indicator 13:

- The number of high school students enrolled in *advanced science courses* did not change between 2012-13 and 2013-14.
- The number of high school students enrolled in *advanced technology courses* and *advanced health science courses* both decreased by about 10% between 2012-13 and 2013-14.
- The number of high school students enrolled in *advanced engineering courses* increased by 13% between 2012-13 and 2013-14.
- The number of high school students enrolled in *advanced math courses* increased by 3% between 2012-13 and 2013-14

STEM college completions

Indicator 14 and 15: Minority student STEM degree completion has risen over 150% since 2009 at the community college level and to a lesser gain at the university level.

STEM employment

Indicator 16: On average in 2012, individuals in STEM occupations earned $10 more per hour and $20,000 more in annual salaries compared to all occupational groups. Specifically, STEM occupations earn $28.28 in mean wages and $58,800 in mean salaries, compared to all occupations overall earning $18.90 in mean wages and $39,300 in mean salaries, respectively.

Indicator 17: As of 2012, there were an estimated 10,000 vacancies in STEM jobs statewide.

Indicator 18: The number of individuals taking the National Career Readiness Certificate (NCRC) has increased from approximately 6,000 in 2012 to over 20,000 in 2013. In both years, approximately two-thirds qualified as STEM workforce-ready as estimated by the Applied Mathematics component.

Section 2. Statewide Survey of Public Attitudes Toward STEM To assess change in public awareness and attitudes toward STEM, a statewide public survey of Iowans was conducted from July through September 2013. A similar survey was previously conducted in 2012.

In 2013, 41% of Iowans had heard of the acronym STEM. In contrast, only 26% of Iowans had heard of the acronym in 2012. This represents a 58% increase in awareness of the acronym STEM from the beginning of Year 1 to Year 2.

Awareness and attitudes toward STEM increased significantly from 2012 to 2013, especially in the areas of economic contributions and broadening STEM participation. From 2012 to 2013, a significant gain was seen in the proportion of Iowans who '*strongly agree*' that more companies would move to Iowa if the state had a reputation for workers with good STEM skills (from 16% to 30%), increased focus on STEM education will improve the state economy (from 15% to 25%), and more should be done to increase the number of women (from 12% to 32%) and under-represented minorities (from 7% to 20%) in STEM jobs, respectively.

In addition, more Iowans see the value that STEM brings to their lives and in the opportunities and jobs available for the next generation. From 2012 to 2013, significantly more Iowans '*strongly agree*' that science and technology are making our lives better (from 40% to 50%), and that advancements in STEM will give more opportunities to the next generation (from 28% to 44%).

The majority of Iowans (86%) say there is an urgent need in Iowa for more resources to be put toward STEM education. Over half of Iowans believe hands on experiences (in elementary classrooms - 68%; with businesses - 56%; or in a lab - 53%) would make a '*major improvement*' in math and science education.

Section 3. Statewide Student Interest Inventory For the past two years, an 8-item interest inventory was added to the Iowa Assessments taken by nearly every student in 3rd through 11th grades in the state annually. The Interest Inventory was developed in part to serve as a data source for both the Iowa STEM Indicators System, and a way to compare students who participate in Scale-Up Programs with all students statewide. Among all students statewide who took the Iowa Assessments, interest in individual STEM subjects is highest among elementary students, followed by middle school and high school students, respectively. While interest in all subjects decreases as students' progress through school, the proportion of students who are *'very interested'* in pursuing a STEM career remains steady at 38-43%.

Section 4. Regional Scale-Up Program Monitoring As part of the Iowa STEM Monitoring Project, all local education agencies implementing a Scale-Up Program were asked to complete three submissions to help evaluate the Scale-Up initiative. This included: 1) a teacher/leader survey, 2) a student participant list, and 3) student surveys. Taken together, the three submissions inform the ISMP by providing the project partners with consistent information across all Scale-Up programs

In 2013-2014, Scale-Up student participants were 48% females and 52% males. The distribution of students by race/ethnicity was 80% white, 9% Hispanic, 5% Black/African American, and 6% Other. This was a small increase in the distribution of females and under-represented minorities from Year 1, which was 44% females to 56% males, and 87% White, 6% Hispanic, 3% Black, and 4% Other, respectively. The average age of student survey respondents was 11.2 years (range: 4-19 years). Elementary students (ages 4-10 years old) returned 39.5% of the total sample of questionnaires (n = 8,340), followed by middle school students (ages 11-13 years old; 37.8%, n = 7,995) and high school students (ages 14-19 years old; 22.7%, n = 4,794), respectively. Among the nine Regional Scale-Up programs offered in 2013-2014, all of the selected programs had positive effects on student interest and awareness in STEM topics and STEM careers. Among students who participated in a Scale-Up program, 9 out of 10 participants reported higher interest in at least one STEM subject or in a STEM career following Scale-Up program participation.

Teachers reported several impacts as a result of implementing Scale-Up programs in Year 2 They observed an increase in student motivation, engagement, and interest in STEM content areas as well as STEM careers. They also reported that students' critical thinking, problem solving, and teamwork skills showed improvement throughout the program. Teachers reported that Scale-Up programs allowed students to explore hands-on learning, which encouraged students to continue work on projects even after programming had ended. As a result of participating in the Scale-Up programs, over three-fourths of the teacher/leaders reported that they have more confidence to teach STEM content (80%), have increased their knowledge in STEM (83%), are better prepared to answer students' STEM-related questions (78%), and have learned effective methods for teaching in STEM-content areas (76%).

Conclusion The data compiled, collected, and synthesized for this report come from a variety of sources. Following the benchmarks established in Year 1, Year 2 showed promise in some indicators and some losses in others. The ISMP will continue to follow these indicators, identify and/or refine other metrics of STEM progress, and strengthen relationships with other data partners in the state. Taken together, this report provides a picture of Iowa's STEM landscape, and how it is evolving following the targeted initiatives of the Iowa Governor's STEM Advisory Council to improve STEM education and workforce development surrounding STEM in Iowa.

Introduction

The Iowa STEM Monitoring Project (ISMP) is a multi-faceted and collaborative effort that works in support of the Iowa Governor's STEM Advisory Council. ISMP partners include the University of Northern Iowa (UNI) Center for Social and Behavioral Research (CSBR), the Iowa State University (ISU) Research Institute for Studies in Education (RISE), and Iowa Testing Programs (ITP) at the University of Iowa (UI). The purpose of the ISMP is to systematically observe a series of defined metrics and information sources to examine changes regarding STEM education and economic development in Iowa centered on the activities of the Iowa Governor's STEM Advisory Council.

The ISMP was developed within an evaluation framework developed in collaboration with the University of Iowa Center for Evaluation and Assessment. This framework included multiple levels of evaluation, additional resources leveraged in support of evaluation, and alignment of evaluation activities with Iowa's STEM initiative goals and priorities. This evaluation framework for the STEM initiative informed the ISMP that was implemented and is reported here. The ISMP monitors changes in Iowa STEM on three levels. Most broadly, the project monitors Iowa STEM in the national context by comparing it to other state initiatives and data collection efforts. At the state level, the project assembles and tracks indicators of progress toward Advisory Council goals and objectives. Within the statewide STEM initiative, the ISMP tracks the processes and potential impacts of Scale-Up programs and other regional efforts.

As the project name and purpose implies, monitoring of the Advisory Council activities in Iowa includes tracking national, state, and program data, analyzing data for trends, and observing the STEM landscape in the state in a systematic way. To that end, the ISMP is comprised of four components: 1) Iowa STEM Indicators System (ISIS); 2) Statewide Survey of Public Attitudes Toward STEM; 3) Statewide Student Interest Inventory; and 4) Regional Scale-Up Program Monitoring. Figure 1 shows the Iowa STEM Monitoring Project infographic. The UNI CSBR coordinates all four ISMP components. Each ISMP partner has specific areas of responsibility with areas of overlap. Ongoing collaboration among ISMP partners in year two continues to serve as one of the keys to the success of the ISMP. This report summarizes the findings from year two of the Iowa STEM Monitoring Project.

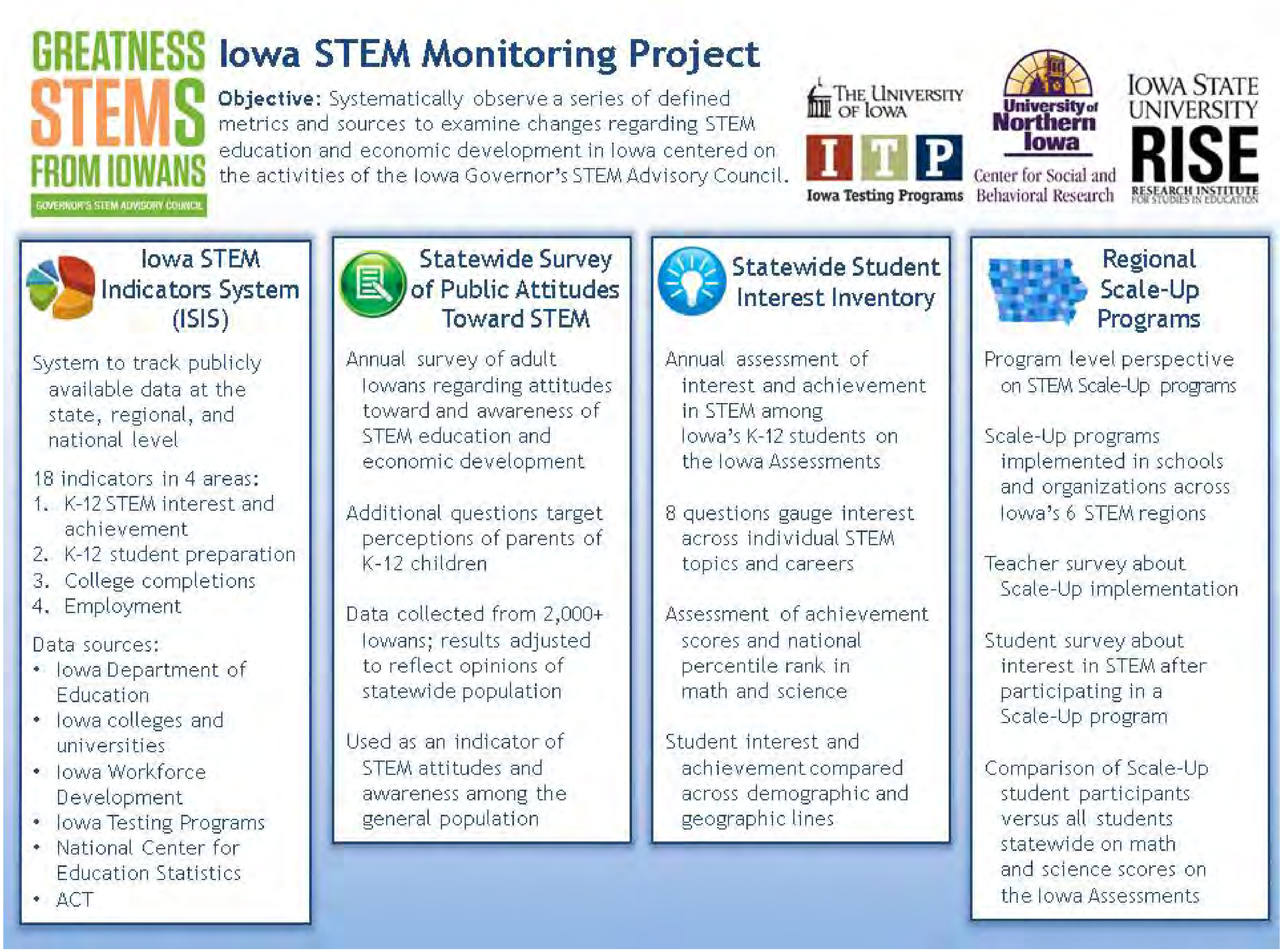


Figure 1. Iowa STEM Monitoring Project infographic

Section 1.
Iowa STEM Indicators System (ISIS)

The Iowa STEM Indicators System (ISIS) is a system to track publicly available data at the national, state, and regional levels. The purpose of the system is to provide annual benchmarks on a variety of STEM topics in education and economic development by systematically assessing the progress and condition of the state's STEM landscape. ISIS was created to identify and fulfill the need for benchmarks related to a variety of sub-topics in the area of STEM education and workforce development. ISIS includes eighteen indicators across four primary areas of focus: 1) STEM achievement and interest among K-12 students, 2) STEM preparation of K-12 students, 3) STEM college completions, and 4) STEM employment (Figure 2). When possible, these indicators are analyzed to include comparisons across demographic, geographic, and other characteristics. Data used to track the ISIS indicators are publicly available and come from sources such as the Iowa Department of Education, the National Center for Education Statistics (NCES), Iowa Workforce Development (IWD), ACT, Iowa Testing Programs, and Iowa colleges and universities (Table 1). Variability in timing of data collection, analysis, and release requires continuous tracking and updating. This variability limits the ability to report on all indicators at the same time annually. In Year 2, all indicators tracked in Year 1 (2012-2013) of the ISMP were reviewed for data quality and applicability in providing useful benchmarks; and decisions were made regarding whether or not to continue ongoing surveillance of the indicator (Table 2). In addition, new or updated indicators were explored as other data and data sources were identified or became available.

For Year 2, three indicators have been replaced with new measures of STEM interest as indicated by the expressed and/or measured interest in STEM subjects on the ACT. These include:

- *Indicator 5:* Interest in STEM among ACT test-takers,
- *Indicator 6:* Educational aspirations of ACT test-takers with interest in STEM,
- *Indicator 7:* Top 5 majors among ACT test-takers with interest in STEM.

In addition, Indicators 14 and 15 have been revised to reflect Iowa Department of Education data on STEM college completions. These include:

- *Indicator 14:* Community college degrees and certificates in STEM fields,
- *Indicator 15:* College and university enrollment and degrees awarded in STEM fields.

GIS data mapping of Indicators

With the cooperation of the Iowa State University Geographic Information Systems (GIS) Support and Research Facility, selected data for Indicators 10, 11, and 13 are available as GIS maps. Data analyzed in this way are plotted and displayed on a state map that includes district boundaries, STEM region boundaries, and locations of Iowa colleges and universities. Decisions about what types of data and analyses are appropriate for mapping continue to evolve throughout the Iowa STEM Monitoring Project. Maps for Indicators 10 and 11 continue to show basic frequency distributions of teachers, while maps for Indicator 13 show female student enrollment relative to the average enrollment of female students. Further analysis will be conducted throughout the upcoming year to explore student-teacher ratios and enrollment equity.

Iowa STEM Indicators System (ISIS)

GREATNESS STEMS FROM IOWANS

Purpose: Benchmark a variety of STEM topics in education and economic development by systematically measuring the progress and condition of the state's STEM landscape. The Iowa STEM Indicators are focused on four primary areas: 1) STEM achievement and interest among K-12 students, 2) STEM preparation of K-12 students, 3) STEM college completions, and 4) STEM employment.

STEM Achievement and Interest among K-12 Students

A. STEM Achievement (Iowa Testing Programs)
- *Indicator 1:* Iowa student achievement in mathematics and science

B. STEM Achievement (National Center for Education Statistics, ACT, College Board)
- *Indicator 2:* Iowa student achievement on NAEP mathematics and science tests
- *Indicator 3:* Number of students taking the ACT and average scores in mathematics/science
- *Indicator 4:* Number and scores of students taking Advance Placement STEM courses in high school

C. STEM Interest (ACT, Iowa Testing Programs)
- *Indicator 5:* Interest in STEM among ACT test-takers
- *Indicator 6:* Educational aspirations of ACT test-takers with interest in STEM
- *Indicator 7:* Top 5 majors among ACT test-takers with interest in STEM
- *Indicator 8:* Number/Percentage of K-12 students interested in STEM topic areas

STEM Preparation of K-12 Students

A. STEM Teachers (Iowa Department of Education)
- *Indicator 9:* Number of current Iowa teachers with licensure in STEM-related subjects
- *Indicator 10:* Number of current Iowa teachers with endorsement to teach STEM-related subjects
- *Indicator 11:* Number of beginning teachers recommended for licensure/endorsement in STEM-related subjects
- *Indicator 12:* Teacher retention in STEM-related subjects

B. STEM Educational Opportunities
- *Indicator 13:* Enrollment in STEM-related courses in high school

STEM College Completions
(Iowa Department of Education)
- *Indicator 14:* Community college awards in STEM fields
- *Indicator 15:* College and university enrollment and degrees in STEM fields

STEM Employment (Iowa Workforce Development, ACT)
- *Indicator 16:* Percent of Iowans in workforce employed in STEM occupations
- *Indicator 17:* Job vacancy rates in STEM occupational areas
- *Indicator 18:* STEM workforce readiness

Updated July 2014

Figure 2. Iowa STEM Indicators System

Table 1. Indicators tracked for 2013-2014

Indicator		Description	Data source	Year 1	Year 2
STEM Achievement and Interest among K-12 Students	1	Iowa student achievement in mathematics and science	Iowa Testing Programs	✓	✓
	2	Iowa student achievement on NAEP mathematics and science tests	National Center for Education Statistics	✓	✓
	3	Number of students taking the ACT and average scores in mathematics/science	ACT	✓	✓
	4	Number of students taking STEM Advanced Placement tests and average scores	College Board	✓	✓
	5	Interest in STEM among ACT test-takers	ACT	*	✓
	6	Educational aspirations of ACT test-takers with interest in STEM	ACT	✓	✓
	7	Top 5 majors among ACT test-takers with interest in STEM	ACT	*	✓
	8	Number/Percentage of K-12 students interested in STEM topic areas	Iowa Testing Programs	✓	✓
STEM Preparation of K-12 Students	9	Number of current Iowa teachers with licensure in STEM subjects	Iowa Department of Education	✓	✓
	10	Number of current Iowa teachers with endorsement to teach STEM subjects	Iowa Department of Education	✓	✓
	11	Number of beginning teachers recommended for licensure/endorsement in STEM subjects	Iowa Department of Education	**	✓
	12	Teacher retention in STEM subjects	Iowa Department of Education	**	✓
	13	Enrollment in STEM courses in high school	Iowa Department of Education	**	✓
STEM College Completions	14	Community college degrees and certificates in STEM fields	Iowa Department of Education	✓	✓
	15	College and university enrollment and degrees awarded in STEM fields	Integrated Postsecondary Education Data System	✓	✓
STEM Employment	16	Percent of Iowans in workforce employed in STEM occupations	Iowa Workforce Development	✓	✓
	17	Job vacancy rates in STEM occupational areas	Iowa Workforce Development	✓	✓
	18	STEM workforce readiness	Iowa Workforce Development	✓	✓

* The initial indicator was under review, and not reported in Year 1. The indicator was replaced in year two.
**Indicator was under analysis, no data included in Year 1 annual report.

Table 2. Summary of revisions to Iowa STEM Indicators System, Year 1 to Year 2

Ind.	2012-2013 Indicator (Year 1)	2013-2014 Indicator (Year 2)	Reason(s) for change
5	Predicted ACT scores among 10^{th} grade ACT-Plan test-takers	Interest in STEM among ACT test-takers	Based on discussions between ISMP partners and ACT researchers, it was decided that tracking predicted ACT scores was unnecessary when Indicator 3 tracks the number of students in Iowa taking the ACT, and actual ACT scores in mathematics and science. Following the release in 2014 of ACT's report *The Condition of STEM 2013: Iowa,*[1], ISMP partners decided to explore ACT data related to expressed and measured interest in STEM.
6	Percentage of ACT test-takers interested in majoring in a STEM area in college	Educational aspirations of ACT test-takers with interest in STEM	This indicator was revised slightly to focus more specifically on the educational aspirations of ACT test-takers who have either an *expressed* interest in pursuing a STEM major or occupation, or a *measured* interest in STEM based on the ACT Interest Inventory in different occupations and majors.
7	Percentage of Iowa 8^{th} graders interested in STEM careers and educational paths	Top 5 majors among ACT test-takers with interest in STEM	It was decided that Indicator 7 in Year 1 was redundant to the interest in STEM tracked across all grade levels in Indicator 8. Therefore, Indicator 7 was changed to be a descriptive indicator of the top 5 majors of students with interest in STEM as a way explore the specific majors of students with interest in STEM
14	Number of college students who complete degrees in individual STEM majors (AA, BA, other)	Community college awards in STEM fields	The data source for Indicators 14 and 15 was changed from the National Center for Education Statistics in Year 1 to the Iowa Department of Education in Year 2. In addition, Indicators 14 and 15 were divided by degrees award from Community Colleges versus Iowa's four-year colleges and Universities. Indicator 14 includes degrees and certificates; Indicator15 includes data for enrollment, bachelor's and graduate/professional degrees. Enrollment data for community colleges was not reported due to variability in the data.
15	Number of college students who complete graduate degrees in individual STEM majors	College and university enrollment and awards in STEM fields	

1. ACT, Inc.. (2014). The Condition of STEM, 2013: Iowa. Iowa City, IA: ACT, Inc. Available from http://www.act.org/stemcondition/13/pdf/Iowa.pdf

Indicator 1: Iowa student achievement in mathematics and science

Data source Iowa Assessments, Iowa Testing Programs, The University of Iowa

Key findings

- Proportions of grade 4 and grade 8 students that exhibited proficiency in mathematics and science decreased between the 2008-2010 and 2011-2013 biennium periods (Table 3). This was true across demographic groups by gender, race, ethnicity, socioeconomic status, and disability.
- Proportions of grade 11 students that exhibited proficiency in *mathematics* and *science* increased between the 2008-2010 and 2011-2013 biennium periods (from 77% to 82% in *mathematics,* and from 83% to 85% in *science,* respectively) (Table 3 and Table 4). Increases were also observed in *mathematics* and *science* achievement across demographic groups by gender, race, ethnicity, socioeconomic status, and disability.
- Overall, there are disparities in proficiency. The proportions of minority students, those of low socioeconomic status, and students with disabilities that exhibit proficiency are consistently lower than the overall rates. This is true in all four biennium periods, all grade levels, and in both subjects.
- The proportion of males and females that exhibit proficiency in mathematics are very similar, if not identical, in all three grade levels. In science, however, there are small differences. Among 8th grade students, a slightly smaller proportion of females are proficient than males. Among 11th grade students, a slightly larger proportion of females are proficient than are males.

Table 3. Percentage of Iowa students statewide who are proficient in *mathematics*

Grade		2008-2010	2009-2011	2010-2012	2011-2013	% Change 2008-2013
4th	Overall	80%	81%	80%	78%	**- 3%**
	Male	81%	82%	80%	78%	**- 4%**
	Female	79%	80%	79%	77%	**- 3%**
	White	84%	84%	83%	81%	**- 4%**
	Black/African Am	52%	51%	51%	48%	**- 8%**
	Hispanic	64%	66%	66%	**	**--**
	Low income	68%	69%	68%	66%	**- 3%**
	Disability	48%	49%	48%	45%	**- 6%**
8th	Overall	76%	77%	76%	74%	**- 3%**
	Male	77%	77%	76%	74%	**- 4%**
	Female	76%	76%	75%	74%	**- 3%**
	White	80%	80%	79%	78%	**- 3%**
	Black/African Am	45%	44%	43%	41%	**- 7%**
	Hispanic	58%	60%	58%	55%	**- 5%**
	Low income	60%	62%	60%	58%	**- 3%**
	Disability	30%	31%	29%	25%	**- 17%**
11th	Overall	77%	77%	80%	82%	**+ 6%**
	Male	78%	78%	81%	82%	**+ 5%**
	Female	76%	76%	79%	82%	**+8%**
	White	80%	81%	83%	85%	**+ 6%**
	Black/African Am	44%	42%	48%	53%	**+ 20%**
	Hispanic	56%	57%	61%	65%	**+ 16%**
	Low income	60%	60%	64%	67%	**+ 12%**
	Disability	32%	31%	37%	42%	**+ 31%**

**Data not reported for the 2011-2013 biennium period.

Data notes: Prior to 2011-2012, National Percentile Rank was used as metric on the Iowa Assessments exams to categorize students who are not proficient (NPR 1-40), proficient (NPR 41-89), and advanced (NPR 90+). Since 2011-2012, the Iowa Standard Score Scale has been used with the level of proficiency variable by the test, test level, and time of year the test was taken.

% Change = the extent that the indicator increased or decreased as a percent of the baseline benchmark. Calculated as: [(Current %-baseline %)/(baseline %)]*100.

Table 4. Percentage of Iowa students statewide who are proficient in *science*

Grade		2008-2010	2009-2011	2010-2012	2011-2013	% Change 2008-2013
8th	Overall	82%	83%	80%	76%	- 7%
	Male	81%	81%	81%	77%	- 5%
	Female	83%	84%	80%	74%	- 11%
	White	85%	85%	83%	80%	- 6%
	Black/African Am	57%	51%	51%	43%	- 25%
	Hispanic	66%	69%	65%	58%	- 12%
	Low income	70%	71%	67%	62%	- 11%
	Disability	47%	47%	44%	37%	- 21%
11th	Overall	83%	84%	85%	85%	+ 2%
	Male	78%	79%	82%	84%	+ 8%
	Female	83%	84%	85%	87%	+ 5%
	White	83%	84%	86%	88%	+ 6%
	Black/African Am	53%	52%	57%	60%	+ 13%
	Hispanic	64%	65%	68%	71%	+ 11%
	Low income	67%	68%	71%	73%	+ 9%
	Disability	42%	44%	47%	49%	+ 17%

Data notes: Prior to 2011-2012, National Percentile Rank was used as metric on the Iowa Assessments exams to categorize students who are not proficient (NPR 1-40), proficient (NPR 41-89), and advanced (NPR 90+). Since 2011-2012, the Iowa Standard Score Scale has been used with the level of proficiency variable by the test, test level, and time of year the test was taken.

% Change = the extent that the indicator increased or decreased as a percent of the baseline benchmark. Calculated as: [(Current %-baseline %)/(baseline %)]*100.

Indicator 2: Iowa student achievement on NAEP mathematics and science tests

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

Key findings

- Among 4th grade students overall, 4th grade females, 4th grade males, and 4th grade Hispanic students in Iowa, *mathematics* scores increased slightly in 2013 (Table 5 and Figure 3).
- Among 4th grade Black students, *mathematics* scores decreased in 2013.
- Among 8th grade students, 2013 *mathematics* scores remained consistent with previous years. *Mathematics* scores among Black and Hispanic 8th graders decreased slightly in 2013.
- Among 12th grade students, the *mathematics* scores of Black students decreased by 13 points from 2009 to 2013. Scores among Hispanic 12th graders increased by 5 points during that time period.
- Since 2007, Iowa's national rank has improved to 14th in the nation regarding 4th grade *mathematics* scores (compared to 15th in 2007). The national rank regarding 8th grade math has not fared as well, with a 2013 ranking of 25th compared to 18th in 2007.
- Small gains were observed in the percent of Iowa students in 4th and 8th grades scoring at or above "proficient" in *mathematics* on the National Assessment of Educational Progress from 2011 to 2013 (net difference of +5% and +2%, respectively).
- Less than half of 4thgraders, approximately one-third of 8thgraders, and approximately one-fourth of 12th graders who took the NAEP mathematics test scored well enough to be rated at or above "proficient" in the subject.
- However, small gains were observed in the percent of Iowa students in 4th and 8th grades scoring at or above "proficient" in *mathematics* on the National Assessment of Educational Progress from 2011 to 2013 (net difference of +5% and +2%, respectively).
- Limited data are available regarding NAEP science scores (Table 6). For those years and grades where data are available, disparities are present in terms of performance when comparing Black and Hispanic student scores to the overall average scores for all students. Average scale scores among Black and Hispanic students fall between 12 and 27 points lower than the average for all students in Iowa.

Table 5. *Mathematics* scores for Iowa students on the National Assessment of Educational Progress

Grade	Variable	2007	2009	2011	2013
4	Scale score[1] (all students)	243	243	243	246
	Scale score (males)	244	243	244	247
	Scale score (females)	241	242	242	244
	Scale score (Black)	224	226	224	218
	Scale score (Hispanic)	230	223	229	234
	National rank[2]	15	19	20	14
	Num. jurisdictions[3] significantly higher than IA	7	6	10	4
	Percent at or above "proficient"	43%	41%	43%	48%
8	Scale score (all students)	285	284	285	285
	Scale score (males)	287	285	286	286
	Scale score (females)	284	284	284	284
	Scale score (Black)	257	259	258	255
	Scale score (Hispanic)	261	266	269	265
	National rank	18	28	25	25
	Num. jurisdictions significantly higher than IA	7	16	18	17
	Percent at or above "proficient"	35%	34%	34%	36%
12*	Scale score (all students)	--	156	--	156
	Scale score (males)	--	156	--	158
	Scale score (females)	--	156	--	154
	Scale score (Black)	--	138	--	125
	Scale score (Hispanic)	--	134	--	139
	National rank	--	*	--	*
	Num. jurisdictions significantly higher than IA	--	*	--	*
	Percent at or above "proficient"	--	25%	--	26%

Source: http://nces.ed.gov/nationsreportcard/statecomparisons/

1. Scale scores range from 0-500 for reading, math, U.S. history, and geography, and 0-300 for science, writing, and civics, respectively.
2. In 2007 and 2009, national rank is out of 51 jurisdictions (50 states plus the District of Columbia). In 2011 and 2013, national rank is based out of 52 jurisdictions (50 states, the District of Columbia, and Department of Defense Education Activity).
3. A jurisdiction is defined as any government defined geographic area sampled in the NAEP assessment.

*Note: Grade 12 NAEP data only available from 11 jurisdictions in 2009 and 13 jurisdictions in 2013, respectively. National rank not reported.

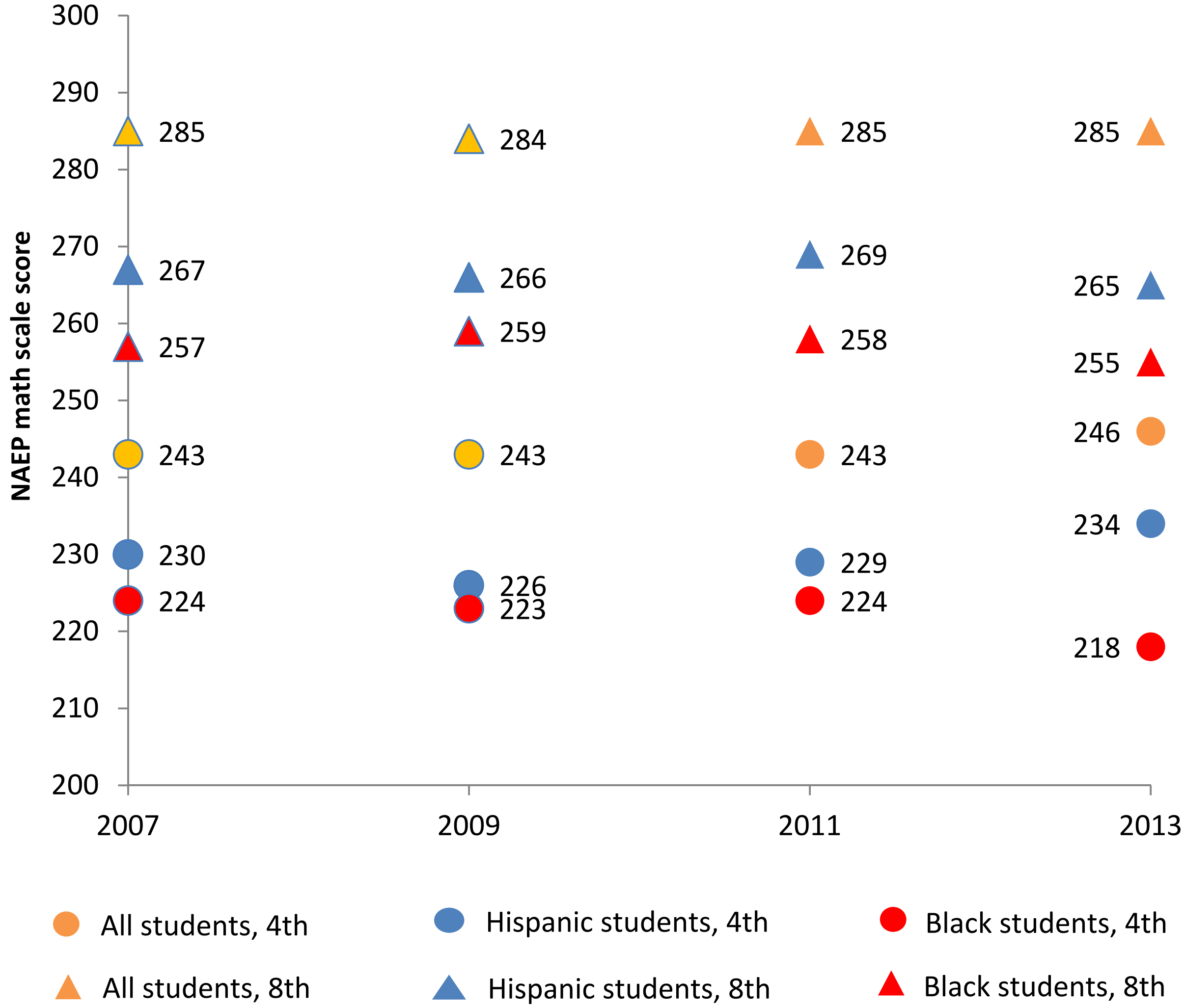


Figure 3. NAEP scores in *mathematics* among White and minority 4th and 8th grade students

Table 6. *Science* scores for Iowa students on the National Assessment of Educational Progress

Grade	Variable	2007*	2009	2011*	2013*
4	Scale score[1] (all students)	--	157	--	--
	Scale score (males)	--	158	--	--
	Scale score (females)	--	157	--	--
	Scale score (Black)	--	130	--	--
	Scale score (Hispanic)	--	134	--	--
	National rank[2]	--	11	--	--
	Num. jurisdictions[3] significantly higher than IA	--	5	--	--
	Percent at or above "proficient"	--	41%	--	--
8	Scale score (all students)	--	156	157	--
	Scale score (males)	--	158	159	--
	Scale score (females)	--	154	155	--
	Scale score (Black)	--	127	128	--
	Scale score (Hispanic)	--	133	143	--
	National rank	--	17	17	--
	Num. jurisdictions significantly higher than IA	--	7	12	--
	Percent at or above "proficient"	--	35%	35%	--
12*	Scale score (all students)	--	--	--	--
	Scale score (males)	--	--	--	--
	Scale score (females)	--	--	--	--
	Scale score (Black)	--	--	--	--
	Scale score (Hispanic)	--	--	--	--
	National rank	--	--	--	--
	Num. jurisdictions significantly higher than IA	--	--	--	--
	Percent at or above "proficient"	--	--	--	--

Source: http://nces.ed.gov/nationsreportcard/statecomparisons/

1. Scale scores range from 0-500 for reading, math, U.S. history, and geography, and 0-300 for science, writing, and civics, respectively.

2. In 2007 and 2009, national rank is out of 51 jurisdictions (50 states plus the District of Columbia). In 2011, national rank is based out of 52 jurisdictions (50 states, the District of Columbia, and Department of Defense Education Activity).

3. A jurisdiction is defined as any government defined geographic area sampled in the NAEP assessment.

*Note. The science assessment was only administered to 4th and 8th grade students in 2009 and only to 8th grade students in 2011; the science assessment was not administered to any grade in 2007 or 2013.

Indicator 3: Number of students taking the ACT and average scores in mathematics and science

Data source ACT, Inc.

Key findings

- Since 2008, the number of Iowa students taking the ACT test has increased slightly from 22,950 to 23,119 (Table 7).
- Since 2008, approximately half of Iowa students taking the ACT are meeting benchmarks for *math* and less than half are meeting benchmarks for *science*.
- The percentage of Iowa students meeting benchmarks for *science* on the ACT increased by 21% from 2012 to 2013 (from 38% in 2012 to 46% in 2013, respectively). Similar gains were also observed in the percentage of females and under-represented minorities who met benchmarks in *science,* including a 27% increase among females, 25% increase among Black/African American students, and 14% increase among Hispanic students.
- Disparities exist among students by race/ethnicity with only about 25% of Hispanic students and 15% of Black/African American students meeting benchmarks in math and science (Table 8, Figure 4, and Figure 5).
- Average ACT scores in math and science have remained consistent from 2008 to 2013.
- Across all years, males consistently score about two points higher on average in *math* and one point higher on average in *science* compared to females.
- By race/ethnicity, Black/African American and Hispanic students consistently score lower than White students (Figure 6 and Figure 7).

Table 7. ACT scores and benchmarks for Iowa students, 2008-2013[1,2]

Race/ Ethnicity		2008	2009	2010	2011	2012	2013
Overall	Number of students tested	22,950	22,377	22,943	22,968	23,119	22,526
	% meeting benchmarks — Math	50%	50%	51%	52%	51%	50%
	% meeting benchmarks — Science	37%	37%	37%	40%	38%	46%
	Average ACT scores — Composite	22.4	22.4	22.2	22.3	22.1	22.1
	Average ACT scores — Math	22.0	21.9	21.8	21.9	21.7	21.6
	Average ACT scores — Science	22.3	22.4	22.3	22.4	22.2	22.2
Males	Number of students tested	10,541	10,207	10,480	10,636	10,684	10,406
	% meeting benchmarks — Math	58%	57%	57%	58%	57%	56%
	% meeting benchmarks — Science	42%	43%	43%	45%	45%	52%
	Average ACT scores — Composite	22.6	22.7	22.5	22.5	22.4	22.3
	Average ACT scores — Math	22.8	22.8	22.6	22.6	22.5	22.3
	Average ACT scores — Science	22.8	23.0	22.9	23.1	22.9	22.8
Females	Number of students tested	12,013	12,117	12,423	12,181	12,380	12,091
	% meeting benchmarks — Math	44%	44%	46%	47%	46%	45%
	% meeting benchmarks — Science	32%	32%	33%	35%	33%	42%
	Average ACT scores — Composite	22.2	22.1	22.0	22.1	21.9	21.9
	Average ACT scores — Math	21.2	21.2	21.1	21.2	21.1	21.0
	Average ACT scores — Science	21.8	21.8	21.8	22.0	21.7	21.7

Source: www.act.org/newsroom/data

1. Scores: Include both an overall Composite Score and individual test scores in four subject areas (English, Mathematics, Reading, Science) that range from 1 (low) to 36 (high). The Composite Score is the average of the four test scores, rounded to the nearest whole number.

2. Benchmarks: the minimum score needed on an ACT subject-area test to indicate a 50% chance of obtaining a B or higher or about a 75% chance of obtaining a C or higher in the corresponding credit-bearing college courses, which includes English Composition, Algebra, Social Science and Biology. The 2013 benchmark scores for math and science were 22 and 23 respectively.

Table 8. ACT scores and benchmarks for Iowa students by student race/ethnicity, 2008-2013[1,2]

Race/ Ethnicity		2008	2009	2010	2011	2012	2013
White	Number of students tested	19,938	19,741	19,967	19,652	19,515	18,712
	% meeting benchmarks — Math	51%	51%	53%	54%	53%	53%
	% meeting benchmarks — Science	38%	38%	39%	42%	40%	49%
	Average ACT scores — Composite	22.5	22.6	22.5	22.6	22.5	22.5
	Average ACT scores — Math	22.1	22.0	22.0	22.1	22.0	21.9
	Average ACT scores — Science	22.4	22.5	22.6	22.8	22.5	22.6
Black/ African American	Number of students tested	435	448	583	583	601	601
	% meeting benchmarks — Math	15%	17%	15%	14%	17%	16%
	% meeting benchmarks — Science	9%	13%	10%	8%	12%	15%
	Average ACT scores — Composite	17.8	18.3	17.3	17.1	17.6	17.3
	Average ACT scores — Math	17.6	18.0	17.5	17.2	17.6	17.4
	Average ACT scores — Science	18.1	18.8	17.9	17.5	18.1	17.8
Hispanic/ Latino	Number of students tested	461	556	700	927	1,140	1,204
	% meeting benchmarks — Math	29%	28%	27%	32%	30%	27%
	% meeting benchmarks — Science	20%	20%	16%	20%	21%	24%
	Average ACT scores — Composite	20.1	19.9	18.9	19.6	19.3	19.1
	Average ACT scores — Math	19.6	19.5	18.9	19.4	19.2	18.9
	Average ACT scores — Science	20.1	20.2	19.4	19.9	19.8	19.4

Source: www.act.org/newsroom/data

1. Scores: Include both an overall Composite Score and individual test scores in four subject areas (English, Mathematics, Reading, Science) that range from 1 (low) to 36 (high). The Composite Score is the average of the four test scores, rounded to the nearest whole number.

2. Benchmarks: the minimum score needed on an ACT subject-area test to indicate a 50% chance of obtaining a B or higher or about a 75% chance of obtaining a C or higher in the corresponding credit-bearing college courses, which includes English Composition, Algebra, Social Science and Biology. The 2013 benchmark scores for math and science were 22 and 23 respectively.

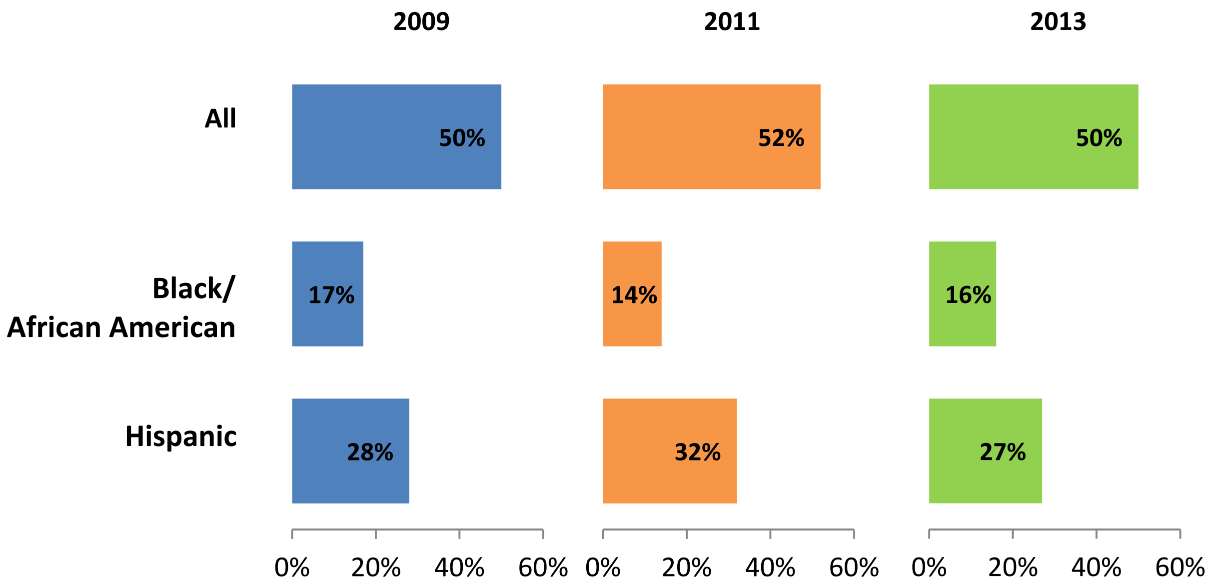


Figure 4. Percentage of Iowa students meeting college readiness benchmarks in *mathematics* based on ACT scores

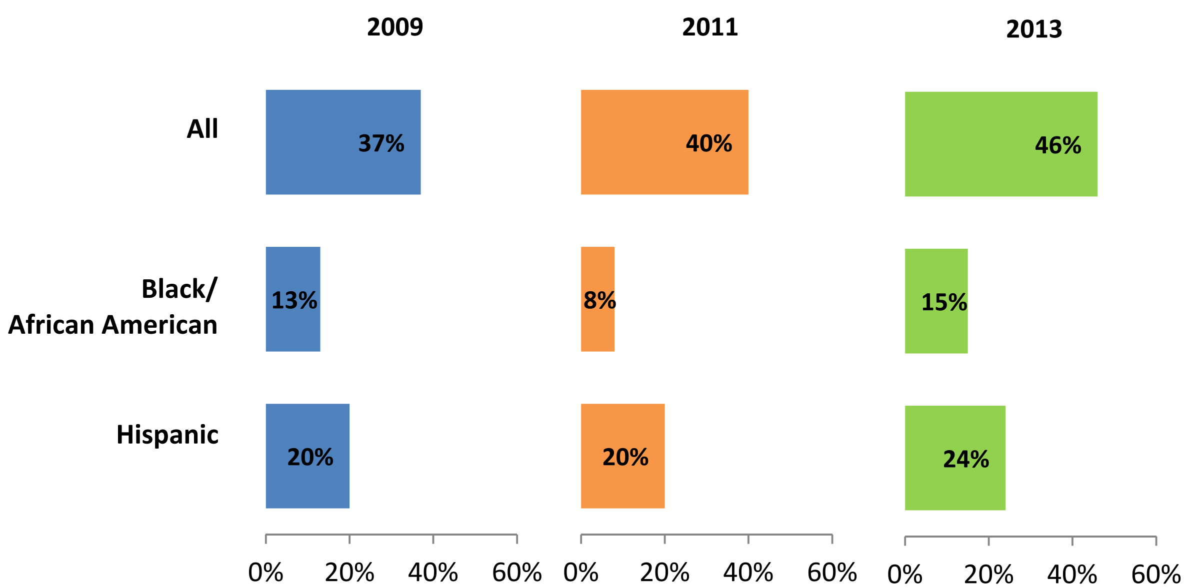


Figure 5. Percentage of Iowa students meeting college readiness benchmarks in *science* based on ACT scores

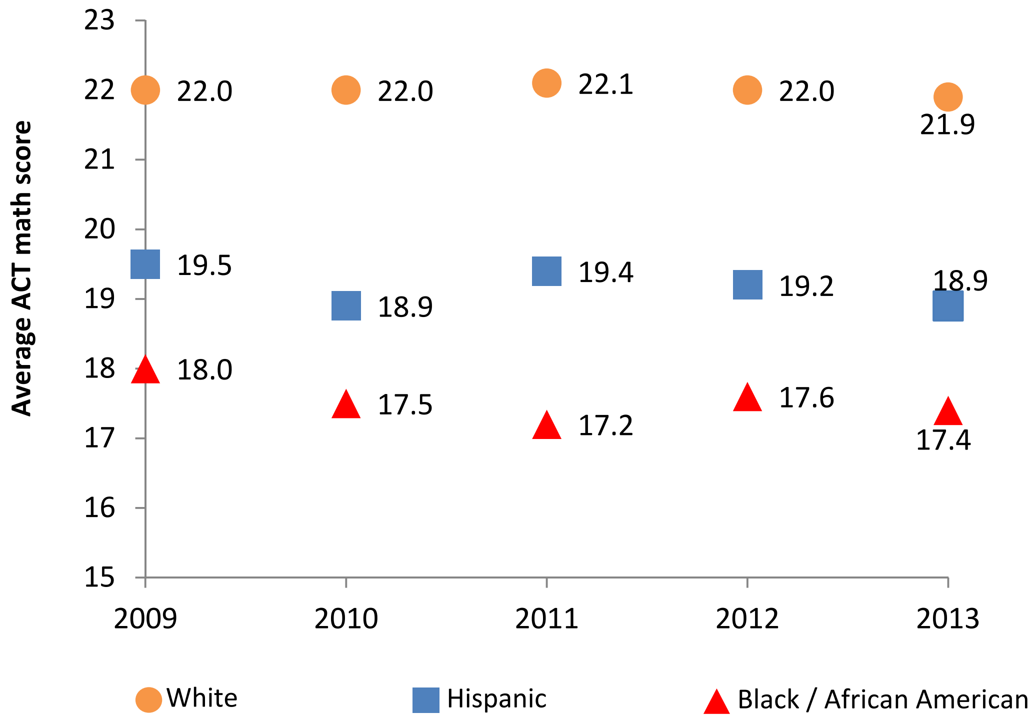


Figure 6. ACT scores in *mathematics* among White and minority students

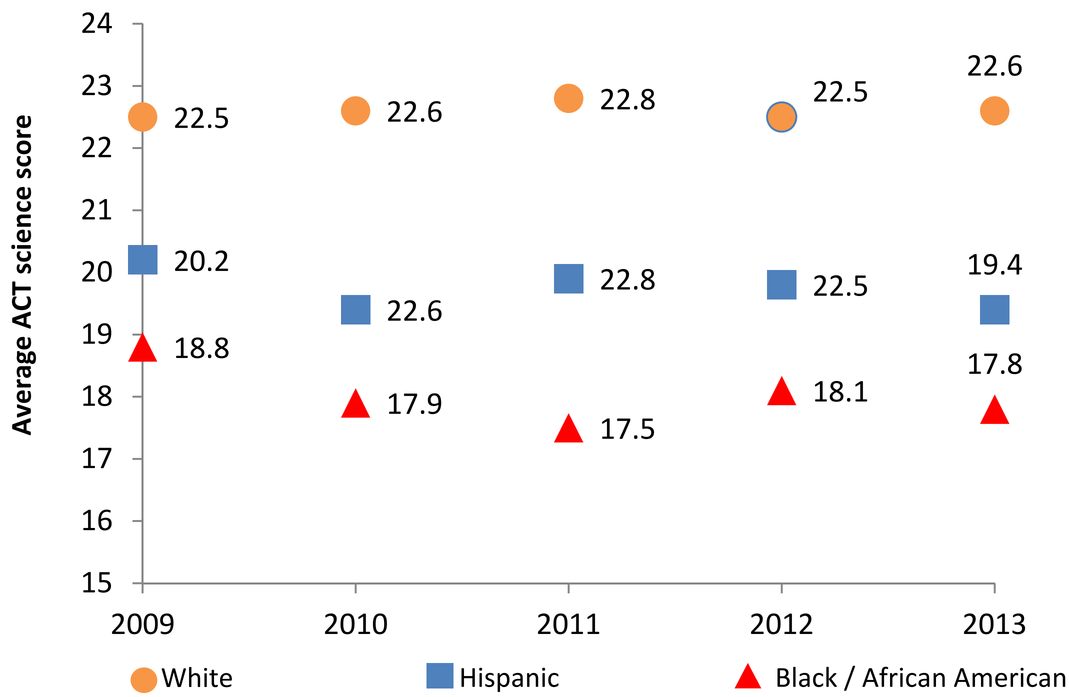


Figure 7. ACT scores in *science* among White and minority students

Indicator 4: Number of students taking STEM-related Advanced Placement (AP) tests and average scores

Data source College Board

Key findings

- Among Iowa high school students taking Advanced Placement (AP) exams in STEM subjects, the percentage that scored 3 or better has remained fairly constant in the past five years (Table 9).
- From 2008 to 2013, the percentage of students scoring 3 or better on the biology AP exam jumped from 57% to 70%.
- The number of students taking the exam has increased over time in all subjects tracked for the purposes of this indicator. The number of students taking the biology exam increased by 274 students (Figure 8).
- From 2012 to 2013, the number of students taking Advanced Placement courses in STEM-related subjects increased from 4,861 to 5,193, as well as the number of students who qualified to receive college credit from these courses (from 3,094 in 2012 to 3,352 in 2013).

Table 9. Percentage of Iowa high school students scoring 3 or higher on Advanced Placement exams in STEM-related topics.

	2008 % (n)	2009 % (n)	2010 % (n)	2011 % (n)	2012 % (n)	2013 % (n)
Biology	57% (461)	57% (478)	54% (525)	57% (531)	55% (588)	70% (735)
Calculus AB	66% (664)	62% (711)	58% (696)	59% (767)	65% (889)	59% (821)
Calculus BC	80% (227)	78% (190)	87% (239)	81% (227)	82% (245)	77% (290)
Chemistry	57% (349)	52% (358)	55% (425)	57% (493)	56% (481)	58% (462)
Computer Science A	100% (21)	71% (17)	81% (65)	79% (57)	77% (53)	80% (94)
Environmental Science	69% (49)	55% (87)	68% (96)	65% (140)	66% (184)	56% (227)
Physics B	79% (183)	75% (198)	76% (238)	72% (240)	73% (243)	71% (277)
Statistics	74% (251)	71% (294)	68% (351)	68% (366)	70% (411)	69% (449)

Source: http://research.collegeboard.org/programs/ap/data/participation/2013

Note. College-level Advanced Placement (AP) courses are available to Iowa high school students through College Board in 22 subject areas. Optional tests are included with the AP courses. Scores can range from 1 to 5, with 3 or better indicating that the student is qualified to receive college credit in that topic. Percentages reflect the proportion of test takers within each subject who scored 3 or higher on that subject exam. Numbers in parentheses indicate the numerator in the proportion.

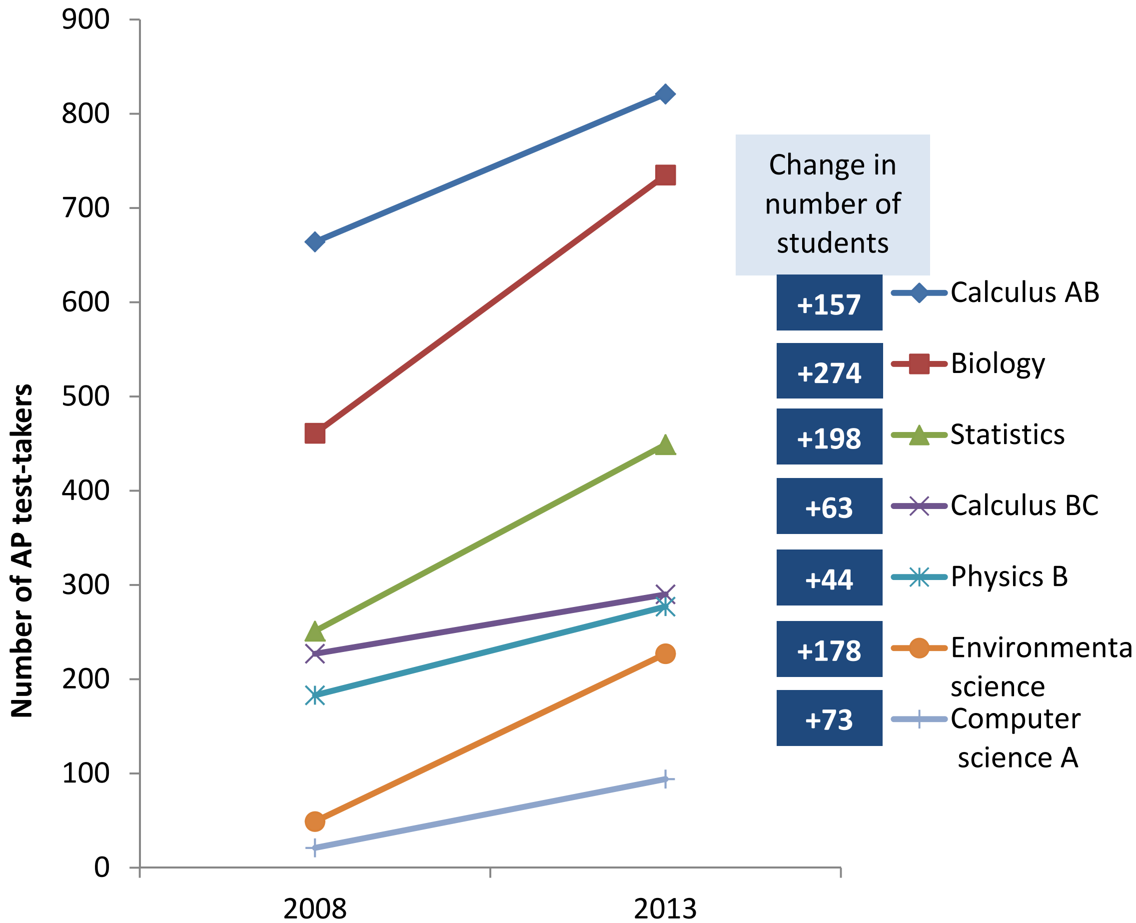


Figure 8. Number of Advance Placement test-takers scoring 3 or higher by subject

New!

Indicator 5: Interest in STEM among ACT test-takers

Note This is a new indicator for the 2014 report.

Data source ACT, Inc.

This indicator uses an aggregated sample of students who have an expressed and/or measured interest solely in STEM content. A student who has an expressed interest in STEM is choosing a major or occupation that corresponds with STEM fields. A measured interest utilizes the ACT Interest Inventory, an inventory administered with the ACT that determines interest in different occupations and majors. Results do not include students who have expressed and/or measured interest in other subject areas.

Key findings

- Interest in STEM is high, with almost half (49%) of students in the 2013 ACT-tested graduating class having an expressed and/or measured interest in STEM majors or occupations (Table 10).
- Interest level in STEM topics has remained fairly constant in the past five years across all subgroups including gender and race/ethnicity (Figure 9).
- Among Hispanic/Latino test-takers, the largest increase in expressed and/or measured interest in a STEM career was in medical and health professions. Since 2009, the percent of students who are Hispanic/Latino who have an expressed and/or measured interest in medical and health fields has increased from 38% in 2009 to 47% in 2013.
- Among Black/African American test-takers, the largest increase in an expressed and/or measured interest in a STEM field was in technology and engineering, which increased from 19% in 2009 to 22% in 2013.

Table 10. Percentage of Iowa high school students who have taken the ACT with an expressed and/or measured interest in STEM-related topics, 2009-2013

STEM Interest		2009	2010	2011	2012	2013
All STEM	All Students	47%	47%	48%	48%	49%
	Female	43%	44%	45%	45%	46%
	Male	51%	51%	52%	52%	52%
	White	47%	48%	49%	49%	49%
	Black/African American	44%	38%	40%	41%	43%
	Hispanic/Latino	49%	46%	48%	48%	49%
Science	All Students	24%	24%	25%	25%	25%
	Female	25%	25%	25%	26%	27%
	Male	24%	24%	24%	24%	22%
	White	25%	24%	25%	25%	25%
	Black/African American	18%	18%	21%	17%	15%
	Hispanic/Latino	28%	23%	23%	24%	22%
Technology and Engineering	All Students	23%	23%	22%	22%	22%
	Female	8%	8%	7%	7%	6%
	Male	38%	38%	38%	37%	39%
	White	23%	23%	23%	22%	22%
	Black/African American	19%	23%	18%	26%	22%
	Hispanic/Latino	24%	24%	27%	18%	23%
Computer Science/ Math	All Students	11%	10%	10%	9%	10%
	Female	6%	6%	6%	5%	5%
	Male	15%	14%	13%	13%	14%
	White	11%	10%	9%	9%	10%
	Black/African American	11%	11%	9%	7%	11%
	Hispanic/Latino	10%	10%	8%	9%	9%
Medical and Health	All Students	42%	43%	43%	44%	43%
	Female	61%	61%	62%	61%	61%
	Male	22%	24%	25%	26%	25%
	White	42%	43%	43%	43%	43%
	Black/African American	52%	48%	51%	49%	52%
	Hispanic/Latino	38%	44%	43%	49%	47%

1. The four STEM areas categorized by ACT include: science, computer science/math, medical and health, and engineering and technology.

- Science includes majors and occupations in the traditional hard sciences, as well as sciences involving the management of natural resources. This also includes science education.
- Computer science/math includes majors and occupations in the computer sciences, as well as general and applied mathematics. This also includes mathematics education.
- Medical and health includes majors and occupations in the health sciences and medical technologies.
- Engineering and technology includes majors and occupations in engineering and engineering technologies.

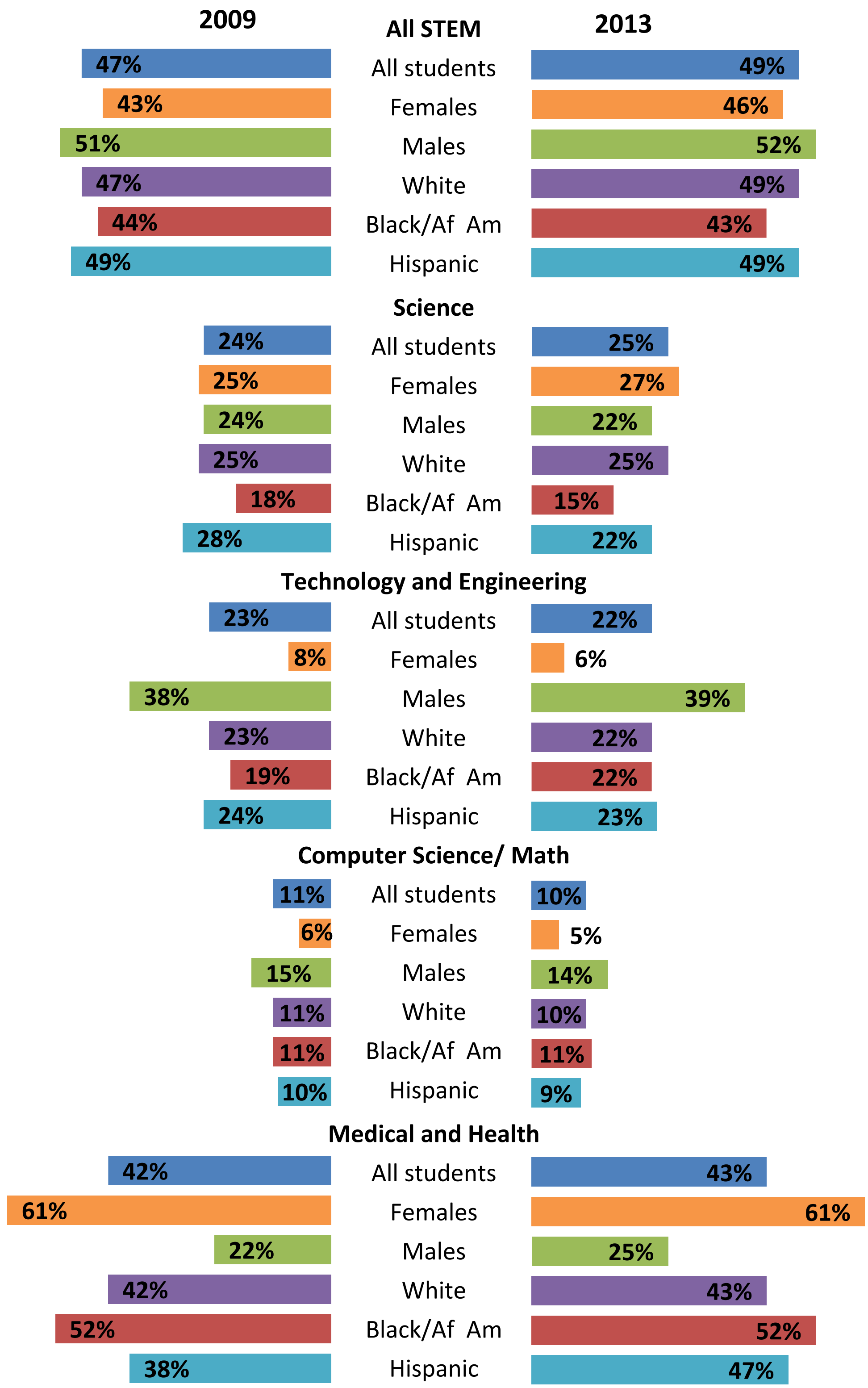


Figure 9. Percentage of Iowa high school students who took the ACT in 2009 and in 2013 who have expressed and/or measured interest in STEM-related topics

New!

Indicator 6: Educational aspirations of ACT test-takers with interest in STEM

Note This is a new indicator for the 2014 report.

Data source ACT, Inc.

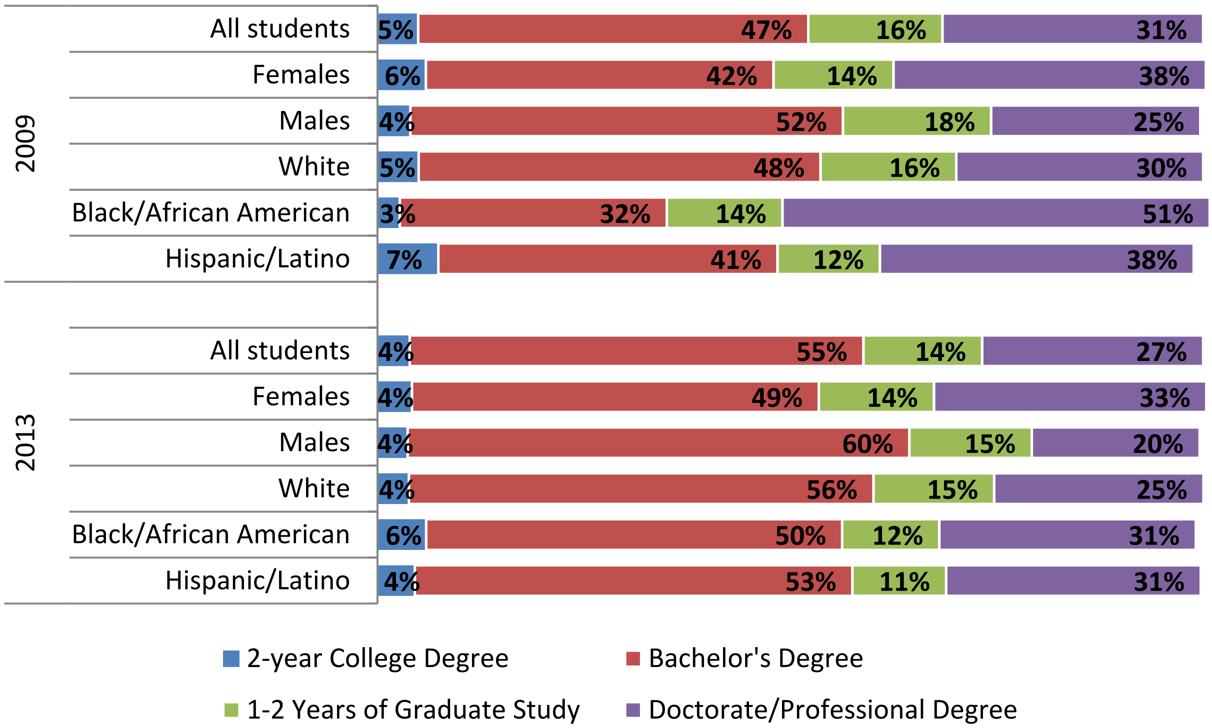
This indicator uses an aggregated sample of students who have an expressed and/or measured interest in STEM only. A student who has an expressed interest in STEM is choosing a major or occupation that corresponds with STEM fields. A measured interest utilizes the ACT interest inventory, an inventory delivered with the ACT that determines inherent interest in different occupations and majors. Results do not include students who have expressed and/or measured interest in alternative subject areas.

Key findings

- Among students who have an expressed and/or measured interest in STEM, approximately 50-60% aspires to obtain a bachelor's degree, 10-15% a master's degree, and 25-30% a doctorate or professional degree across all subgroups by gender or race/ethnicity (Table 11).
- Compared to five years ago, a greater proportion of students with an expressed and/or measured interest in STEM have educational aspirations for a bachelor's degree, with proportionally fewer students intending to pursue a doctorate or professional degree (Figure 10).

Table 11. Educational aspirations among Iowa high school students who took the ACT with an expressed and/or measured interest in STEM-related topics, 2009-2013

Group	Degree Intention	2009	2010	2011	2012	2013
All Students	Vocational/Tech (< 2 years)	>1%	>1%	>1%	>1%	>1%
	Two-Year College Degree	5%	6%	4%	4%	4%
	Bachelor's Degree	47%	46%	49%	54%	55%
	1-2 Years of Grad Study	16%	15%	15%	16%	14%
	Doctorate/ Prof. Degree	31%	32%	31%	27%	27%
Females	Vocational/Tech (< 2 years)	>1%	>1%	>1%	>1%	>1%
	Two-Year College Degree	6%	6%	4%	4%	4%
	Bachelor's Degree	42%	41%	44%	50%	49%
	1-2 Years of Grad Study	14%	16%	15%	15%	14%
	Doctorate/ Prof. Degree	38%	37%	36%	31%	33%
Males	Vocational/Tech (< 2 years)	1%	1%	1%	1%	1%
	Two-Year College Degree	4%	5%	4%	3%	4%
	Bachelor's Degree	52%	51%	55%	57%	60%
	1-2 Years of Grad Study	18%	15%	15%	16%	15%
	Doctorate/ Prof. Degree	25%	28%	25%	23%	20%
White	Vocational/Tech (< 2 years)	>1%	>1%	>1%	>1%	>1%
	Two-Year College Degree	5%	6%	4%	3%	4%
	Bachelor's Degree	48%	47%	51%	55%	56%
	1-2 Years of Grad Study	16%	16%	15%	16%	15%
	Doctorate/ Prof. Degree	30%	31%	29%	25%	25%
Black/ African American	Vocational/Tech (< 2 years)	0%	2%	3%	2%	2%
	Two-Year College Degree	3%	11%	4%	4%	6%
	Bachelor's Degree	32%	29%	38%	46%	50%
	1-2 Years of Grad Study	14%	16%	13%	12%	12%
	Doctorate/ Prof. Degree	51%	41%	42%	35%	31%
Hispanic/ Latino	Vocational/Tech (< 2 years)	2%	2%	1%	>1%	1%
	Two-Year College Degree	7%	9%	5%	5%	5%
	Bachelor's Degree	41%	39%	46%	49%	53%
	1-2 Years of Grad Study	12%	10%	13%	13%	11%
	Doctorate/ Prof. Degree	38%	40%	35%	33%	31%



Note: Degree intentions for a vocational or technology degrees/certificates not shown in figure due to less than or equal to 1% of population for all years and subgroups (see Table 10).

Figure 10. Educational aspirations of Iowa high school students who took the ACT in 2009 and in 2013 with an expressed and/or measured interest in STEM-related topics

New!

Indicator 7: Top 5 majors among ACT test-takers with interest in STEM

Note This is a new indicator for the 2014 report.

Data source ACT, Inc.

This indicator uses an aggregated sample of students who have an expressed and/or measured interest in STEM only. A student who has an expressed interest in STEM is choosing a major or occupation that corresponds with STEM fields. A measured interest utilizes the ACT interest inventory, an inventory delivered with the ACT that determines inherent interest in different occupations and majors. Results do not include students who have expressed and/or measured interest in alternative subject areas.

Key findings

- Overall, the top three majors among ACT test-takers with an expressed and/or measured interest in STEM were all in health and medical fields (Table 12). This was also true for students who are females, Black/African American, or Hispanic/Latino.
- In 2013, the top five majors for females with interest in STEM were in health-related fields (nursing, medicine, physical therapy), animal sciences, and biology. For males with interest in STEM, the top five majors were engineering (mechanical and general), medicine, physical therapy and computer technology.
- In 2013, following the top three health-related majors, both students who were Black/African American or Hispanic/Latino indicated mechanical engineering as a major, which was not in the top five for either group in 2009.

Table 12. Change from 2009 to 2013 in top 5 majors among ACT test-takers in Iowa who have expressed and/or measured interest in STEM

Group	2009	2013
All Students	1. Nursing, Registered (B.S./R.N.) 2. Medicine (Pre-Medicine) 3. Physical Therapy 4. Engineering, General 5. Biology, General	1. Nursing, Registered (B.S./R.N.) 2. Medicine (Pre-Medicine) 3. Physical Therapy 4. Athletic Training 5. Mechanical Engineering
Females	1. Nursing, Registered (B.S./R.N.) 2. Medicine (Pre-Medicine) 3. Physical Therapy 4. Biology, General 5. Pharmacy (Pre-Pharmacy)	1. Nursing, Registered (B.S./R.N.) 2. Medicine (Pre-Medicine) 3. Physical Therapy 4. Animal Sciences 5. Biology, General
Males	1. Engineering, General 2. Computer Science & Programming 3. Physical Therapy 4. Medicine (Pre-Medicine) 5. Physical Sciences, General	1. Mechanical Engineering 2. Medicine (Pre-Medicine) 3. Athletic Training 4. Engineering, General 5. Computer Science & Programming
White	1. Nursing, Registered (B.S./R.N.) 2. Physical Therapy 3. Medicine (Pre-Medicine) 4. Engineering, General 5. Biology, General	1. Nursing, Registered (B.S./R.N.) 2. Medicine (Pre-Medicine) 3. Physical Therapy 4. Athletic Training 5. Mechanical Engineering
Black/ African American	1. Nursing, Registered (B.S./R.N.) 2. Medicine (Pre-Medicine) 3. Physical Therapy 4. Pharmacy (Pre-Pharmacy) 5. Chemistry	1. Medicine (Pre-Medicine) 2. Nursing, Registered (B.S./R.N.) 3. Athletic Training 4. Mechanical Engineering 5. Nursing, Practical/Vocational (LPN)
Hispanic/ Latino	1. Nursing, Registered (B.S./R.N.) 2. Medicine (Pre-Medicine) 3. Engineering, General 4. Biology, General 5. Physical Sciences, General	1. Medicine (Pre-Medicine) 2. Nursing, Registered (B.S./R.N.) 3. Physical Therapy 4. Mechanical Engineering 5. Architecture, General

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

Data source Iowa Assessments, Iowa Testing Programs, The University of Iowa

Key findings

- Student interest in individual STEM topics or in pursuing STEM careers has remained stable between the 2012-2013 year and the 2013-2014 year (Figure 11).
- Among all students statewide who took the Iowa Assessments, interest in the four STEM subjects and STEM careers was highest among elementary students followed by middle school and high school students (Figure 12).
- More information and other results from the interest inventory can be found in 'Section 3. Statewide Student Interest Inventory', 'Section 4.2 Report of Participant Information', and Appendix A.

2012-2013

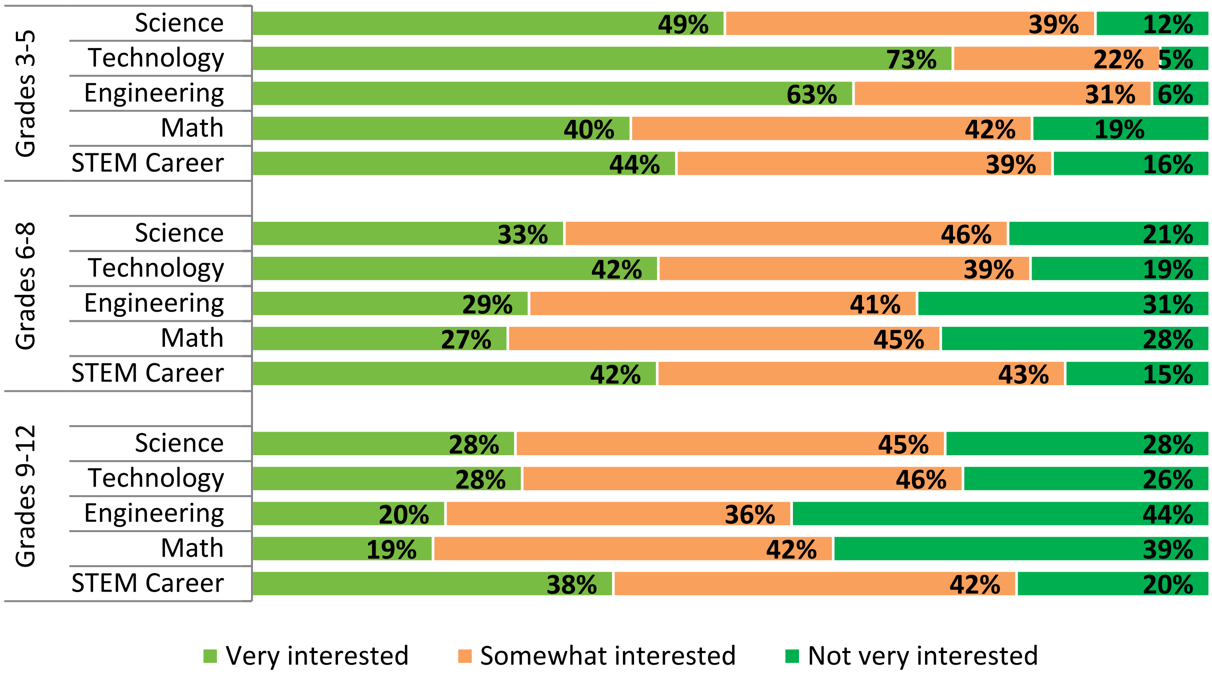


Figure 11. Statewide student interest in STEM topics and STEM careers by grade group, 2012-2013

2013-2014

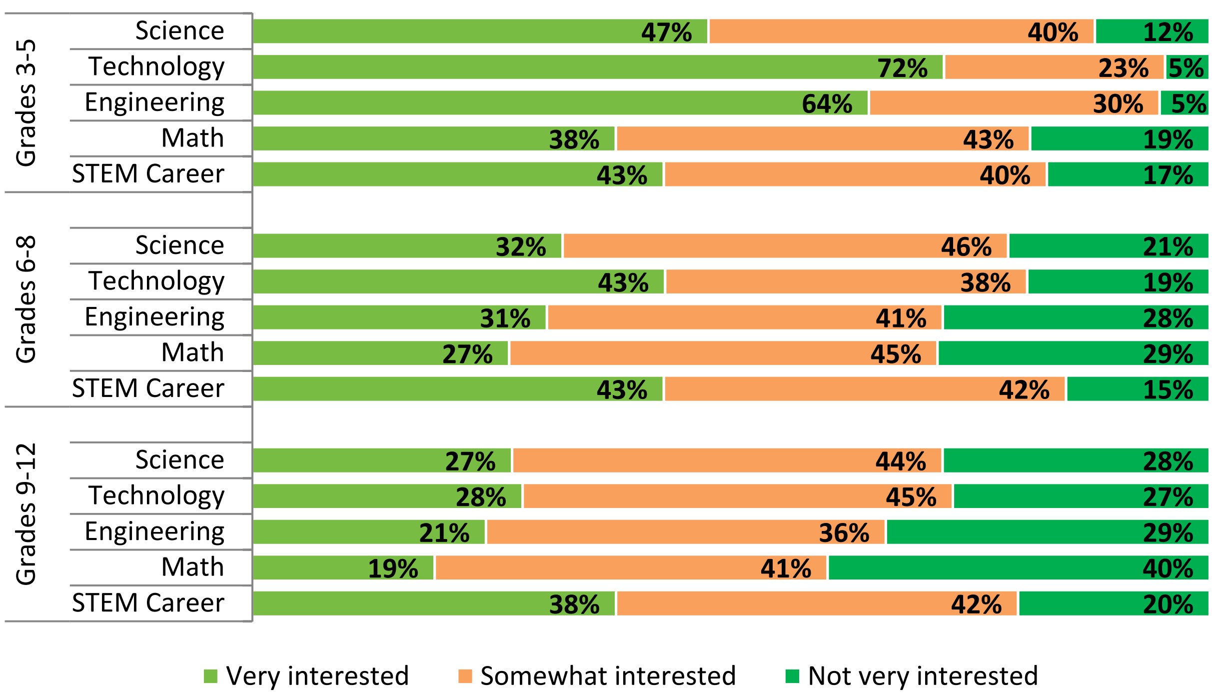


Figure 12. Statewide student interest in STEM topics and STEM careers by grade group, 2013-2014

Indicator 9: Number of current Iowa teachers with licensure in STEM-related subjects

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

Key findings

Indicator 9 examines the preparation and qualifications of STEM-related high school teachers in terms of the level or type of licensure they hold. Teachers of STEM-subjects were defined as those who teach STEM subjects within a specified list of SCED codes related to NAEP definitions (See Appendix B). License types reflect career progress from beginning teachers ("Initial") to full professionals ("Standard") and beyond ("Master Educator").

- The total number of licensed high school STEM teachers in Iowa decreased by approximately 12% between 2012-13 and 2013-14. This decrease is noteworthy given that the number of high school students in the state of Iowa remained stable.
    - The number of high school teachers with *initial* licenses in STEM-subject areas decreased by approximately 19%.
    - The number of high school teachers with *standard* licenses in STEM-subject areas decreased by approximately 17%.
    - The number of high school teachers with *master educator* licenses in STEM-subject areas did not change.

In other words, Iowa is retaining the STEM teachers with more teaching experience and more education, and losing STEM teachers with less experience and possibly less education.

Table 13. Distribution of teacher licensures: Iowa teachers in STEM-subject areas, 2010-2014

	2010-11	2011-12	2012-2013	2013-14
Initial	143	135	171	139
Standard	1,258	1,213	1,202	999
Master Educator[1]	605	631	646	646
Others[2]	38	50	48	42
TOTAL	**2,044**	**2,029**	**2,067**	**1,826**

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

Note 1: Teachers with a "Permanent Professional" license are included in this group.

Note 2: Others includes the following licenses: Career and Technical, Class A, Class E, Nontraditional Exchange, One-Year Conditional, Professional Administrator, Regional Exchange, Substitute, and Teacher Intern.

Note 3: No data were reported for Lisbon Community School District for 2010-11, 2011-12, 2012-13.

Note 4: No data were reported for Northeast Hamilton School District for 2013-14.

Tables 13, 14, and 15 provide the number of STEM-related high school teachers by both content area and license type for the past four years.

- Regardless of license type, math and science continue to be the content areas in which most STEM-related high school teachers teach.
- Most content areas, regardless of license type, present a loss of teachers since 2010-11.
- An exception to this is the number of teachers with master educator licenses, which has steadily increased, specifically in the areas of math, science, and engineering.

Table 14. Distribution of high school teachers with *initial* licenses by STEM content area, 2010-2014

2	Net Change	2010-11	2011-12	2012-13	2013-14
Science	6%	80	75	104	85
Math	-16%	49	50	44	41
Technology	-33%	9	10	16	6
Engineering	-11%	9	5	11	8
Health	0%	0	1	1	0
TOTAL		**143**	**135**	**171**	**140**

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

Note 1: No data were reported for Lisbon Community School District for 2010-11, 2011-12, and 2012-13.

Note 2: No data were reported for Northeast Hamilton Community School District for 2013-14.

Note 3: The data do not present unique numbers for 2013-14. Some teachers teach multiple STEM subjects (i.e., one teacher is responsible for both math and science courses), and therefore those teachers are counted more than once in these tables.

Table 15. Distribution of high school teachers with *standard* licenses by STEM content area, 2010-2014

	Net Change	2010-11	2011-12	2012-13	2013-14
Science	-16%	596	595	581	499
Math	-16%	455	492	428	381
Technology	-54%	151	128	125	70
Engineering	-11%	108	115	123	96
Health	-100%	1	0	1	0
TOTAL		**1,258**	**1,213**	**1,202**	**1,046**

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

Note 1: No data were reported for Lisbon Community School District for 2010-11, 2011-12, and 2012-13.

Note 2: No data were reported for Northeast Hamilton Community School District for 2013-14.

Note 3: The data do not present unique numbers for 2013-14. Some teachers teach multiple STEM subjects (i.e., one teacher is responsible for both math and science courses), and therefore those teachers are counted more than once in these tables.

Table 16. Distribution of high school teachers with *master educator* licenses by STEM content area, 2010-2014

	Net Change	2010-11	2011-12	2012-13	2013-14
Science	5%	294	303	296	310
Math	11%	246	256	272	273
Technology	-40%	62	61	57	37
Engineering	62%	37	41	55	60
Health	0%	0	0	1	0
TOTAL		**608**	**631**	**646**	**680**

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

Note 1: No data were reported for Lisbon Community School District for 2010-11, 2011-12, and 2012-13.

Note 2: No data were reported for Northeast Hamilton Community School District for 2013-14.

Note 3: The data do not present unique numbers for 2013-14. Some teachers teach multiple STEM subjects (i.e., one teacher is responsible for both math and science courses), and therefore those teachers are counted more than once in these tables

Indicator 10: Number of current Iowa teachers with endorsement to teach STEM-related subjects

Data source Basic Educational Data Survey (BEDS), Iowa Department of Education

Indicator 10 examines the preparation and qualifications of STEM-subject teachers in terms of the number and types of endorsements they hold in science, mathematics, and other STEM-related areas. This includes teachers with any science and/or mathematics endorsements, as well as teachers who hold content-specific science endorsements such as biology, chemistry, and physics, STEM-related areas of agriculture, health, and industrial technology, and grade-level science endorsements. There are no specific endorsements for content areas within mathematics such as algebra, calculus, etc. It is important to note that a STEM-related subject endorsement was proposed and approved toward the end of the 2013-14 academic year. This integrated STEM-related subject endorsement is not included in this year's analysis but will be included in future reports as the data become available.

Key findings

- The number of teachers in Iowa with a teaching endorsement in a STEM-related area (Science, Technology, Math, Health Sciences, Agriculture) increased across the board from 2012-13 to 2013-14 (Table 16).
- The number of teachers who held at least one endorsement in an area of science or math increased by 13%. These increases are noteworthy given that the number of students in Iowa remained stable between 2012-13 and 2013-14.

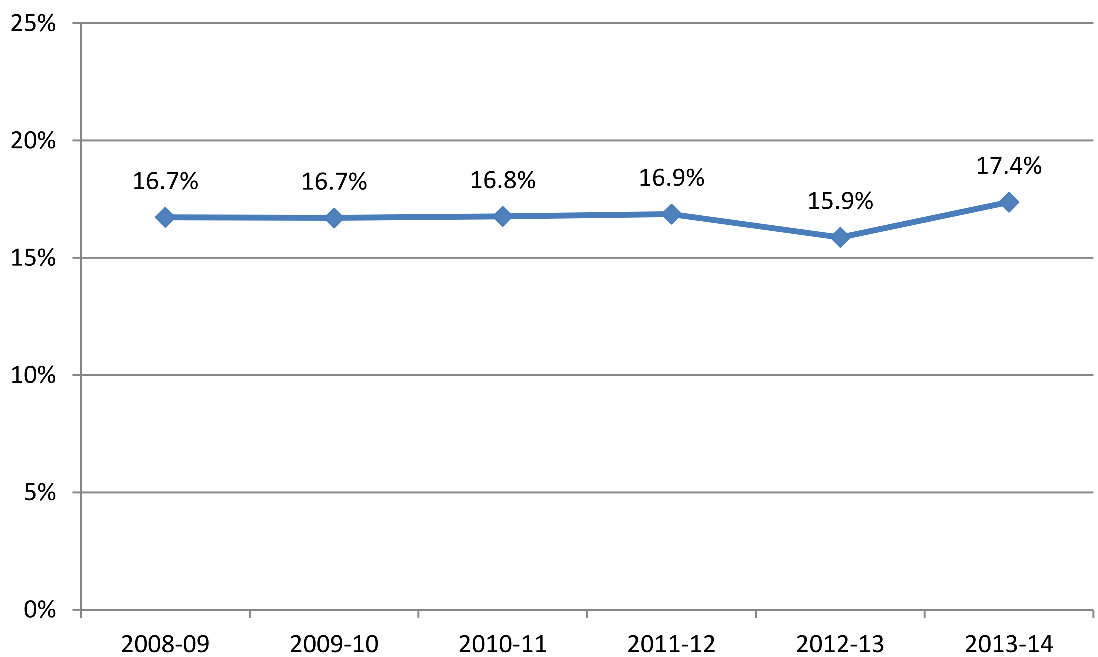
Table 17. Distribution of Iowa teachers with STEM-related subject endorsements, 2008-2014

STEM Endorsement	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
All Sciences	2,616	2,590	2,541	2,546	2,412	2,715
All Math	2,768	2,772	2,768	2,824	2,713	3,053
Biology 5-12	1,599	1,575	1,527	1,533	1,427	1,558
Chemistry 5-12	998	994	940	947	880	970
Physics 5-12	652	642	600	585	525	588
Agriculture 5-12	270	269	280	261	237	264
Health 5-12	21	28	26	28	24	27
Industrial Technology 5-12	609	587	558	537	483	507
Ag, Health & Tech 5-12	900	884	864	826	744	798
Science-Elementary	569	561	563	551	529	585
Science-Secondary	2,123	2,092	2,030	2,022	1,880	2,032
Science-Middle	37	44	61	88	109	228

Data source: Basic Educational Data Survey (BEDS), Iowa Department of Education

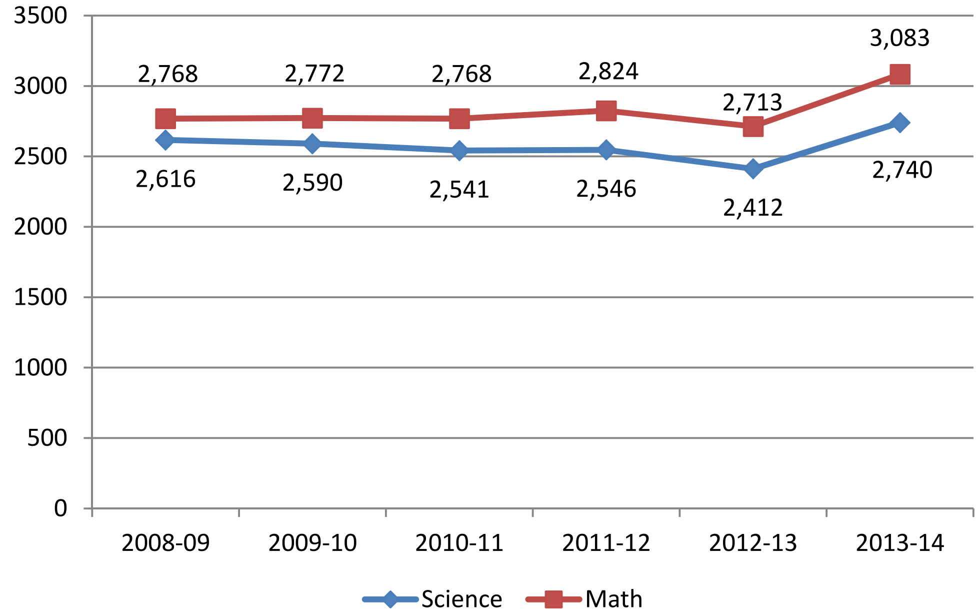
Although annual change has occurred throughout the years, the number of teachers with endorsements in biology, chemistry, agriculture, and health in 2013-14 is fairly comparable to the number of teachers who held these endorsements in 2008-09. This is in contrast to the number of teachers with endorsements in physics and technology which are still 10% and 17% lower, respectively, than the number of teachers with these endorsements in 2008-09, despite having increased total number of teachers in these areas by 12% and 5% since last year.

- From 2012-2013 to 2013-2014, the numbers of teachers with elementary and secondary school science endorsements increased by 11% and 8%, respectively.
- The number of teachers with middle school science endorsements more than doubled from 109 teachers to 228 teachers, an increase of 109% since 2012-13 and over 500% since 2008-09. (Figures 14-16).



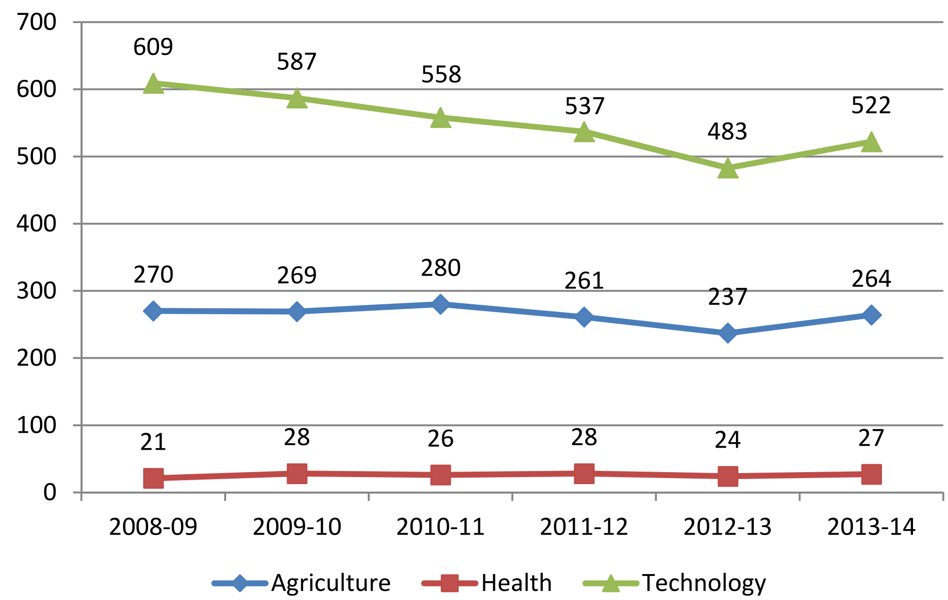
Data source: Basic Educational Data Survey (BEDS), Iowa Department of Education, May 2014

Figure 13. Percentage of K-12 teachers in Iowa with at least one STEM-related endorsement



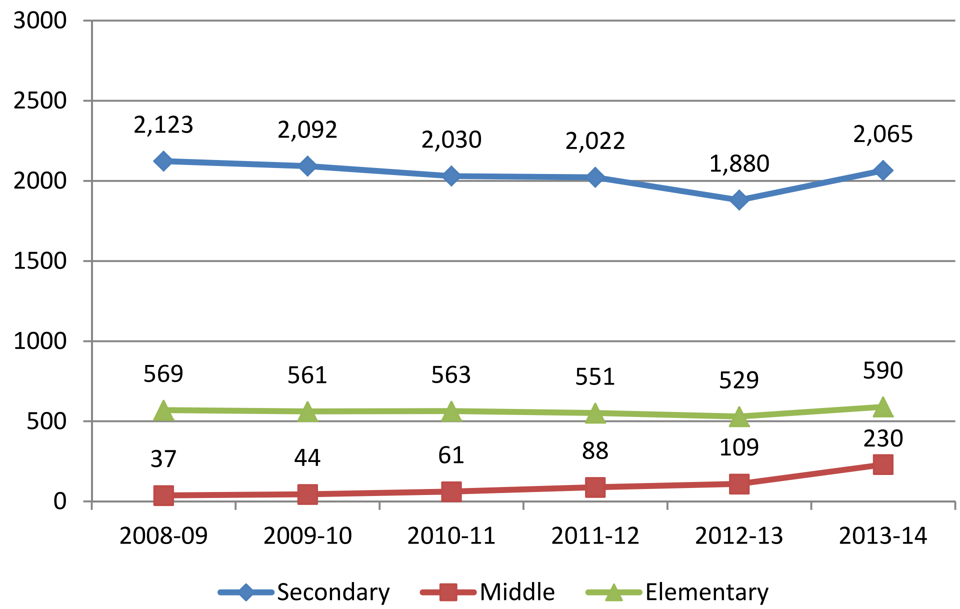
Data source: Basic Educational Data Survey (BEDS), Iowa Department of Education, May 2014

Figure 14. Number of Iowa teachers with an endorsement in math or science



Data source: Basic Educational Data Survey (BEDS), Iowa Department of Education, May 2014

Figure 15. Number of Iowa teachers with an endorsement in a STEM-subject area



Data source: Basic Educational Data Survey (BEDS), Iowa Department of Education, May 2014

Figure 16. Number of Iowa teachers by grade level with an endorsement in science

Additional representations of the tabled data are included in Appendix C.

Maps for Indicator 10 show the geographical distributions of teachers with STEM-subject related endorsements in science, mathematics, biology, chemistry, physics, agriculture, and technology for 2008-09 through 2013-14. The most recent data is displayed on the maps below. Maps for 2008-09 through 2012-13 can be found in Appendix D.

Because the ongoing process of district reorganization and/or consolidation creates boundary changes over time, the decision was made to begin data mapping using the 2012-13 district structure (n=348) which was the most recent district structure when the Iowa STEM Monitoring Project began. Districts that consolidated since 2008-09 are represented by their current boundaries and data from the previously separate districts have been aggregated and reported under their current configuration. In 2013-14, four more districts merged/consolidated, reducing the number of districts to 346. For a full list of district mergers and consolidations since 2008-09 see Appendix E.

In reviewing the maps (Figures 17-23), it is important to note that all of the districts that reported no teachers endorsed in mathematics or science are districts that do not include grades 7-12. However, there are other districts that do not have grades 7-12 but have STEM-subject related endorsed teachers; their numbers are reported on the maps.

- There is an uneven distribution of teachers with math/science endorsements, and even some districts with no endorsements.
- Biology appears to be the most prevalent course-specific endorsement across the state whereas agriculture appears to be the least prevalent endorsement.

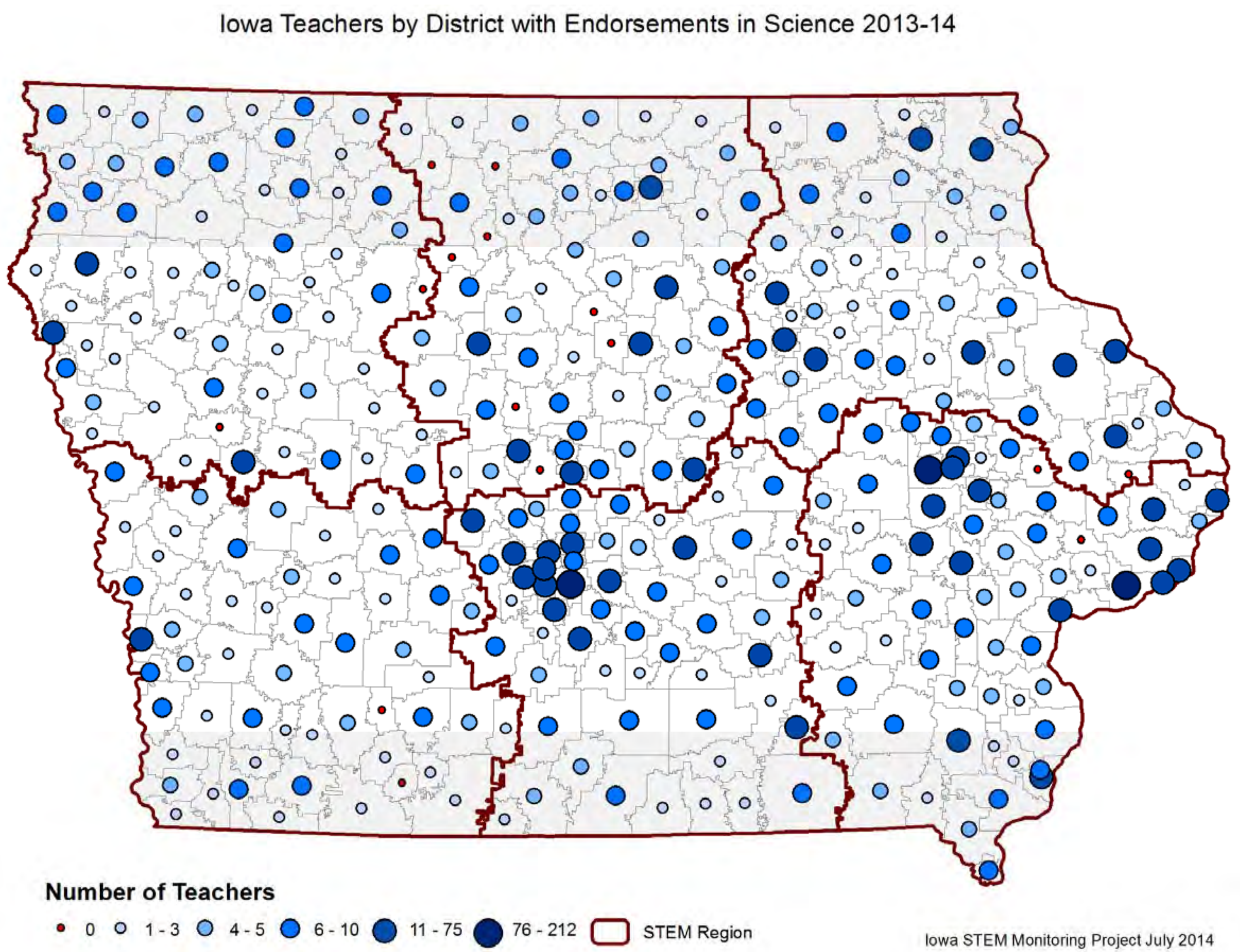


Figure 17. Iowa teachers by district with endorsements in science, 2013-2014

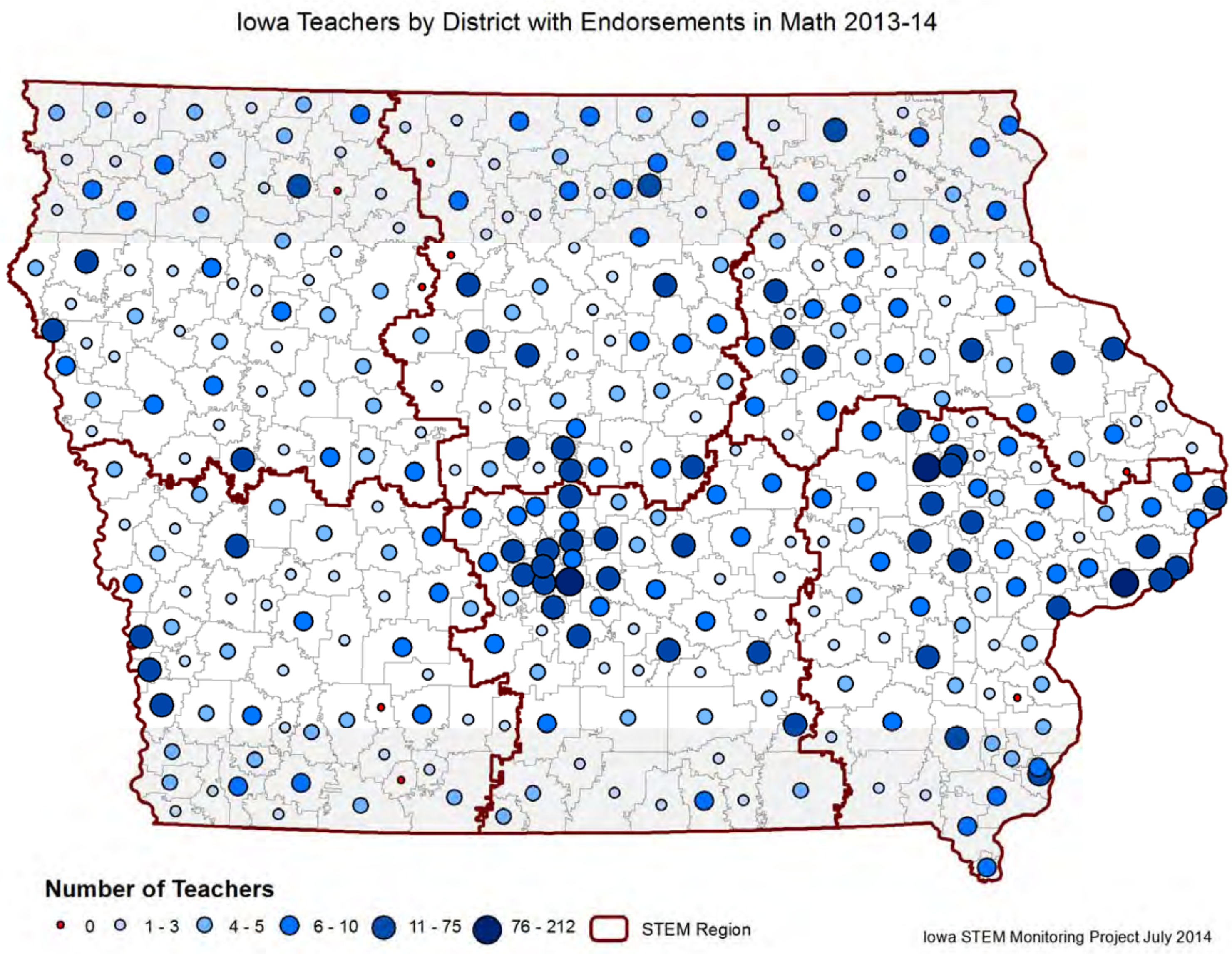


Figure 18. Iowa teachers by district with endorsements in math, 2013-2014

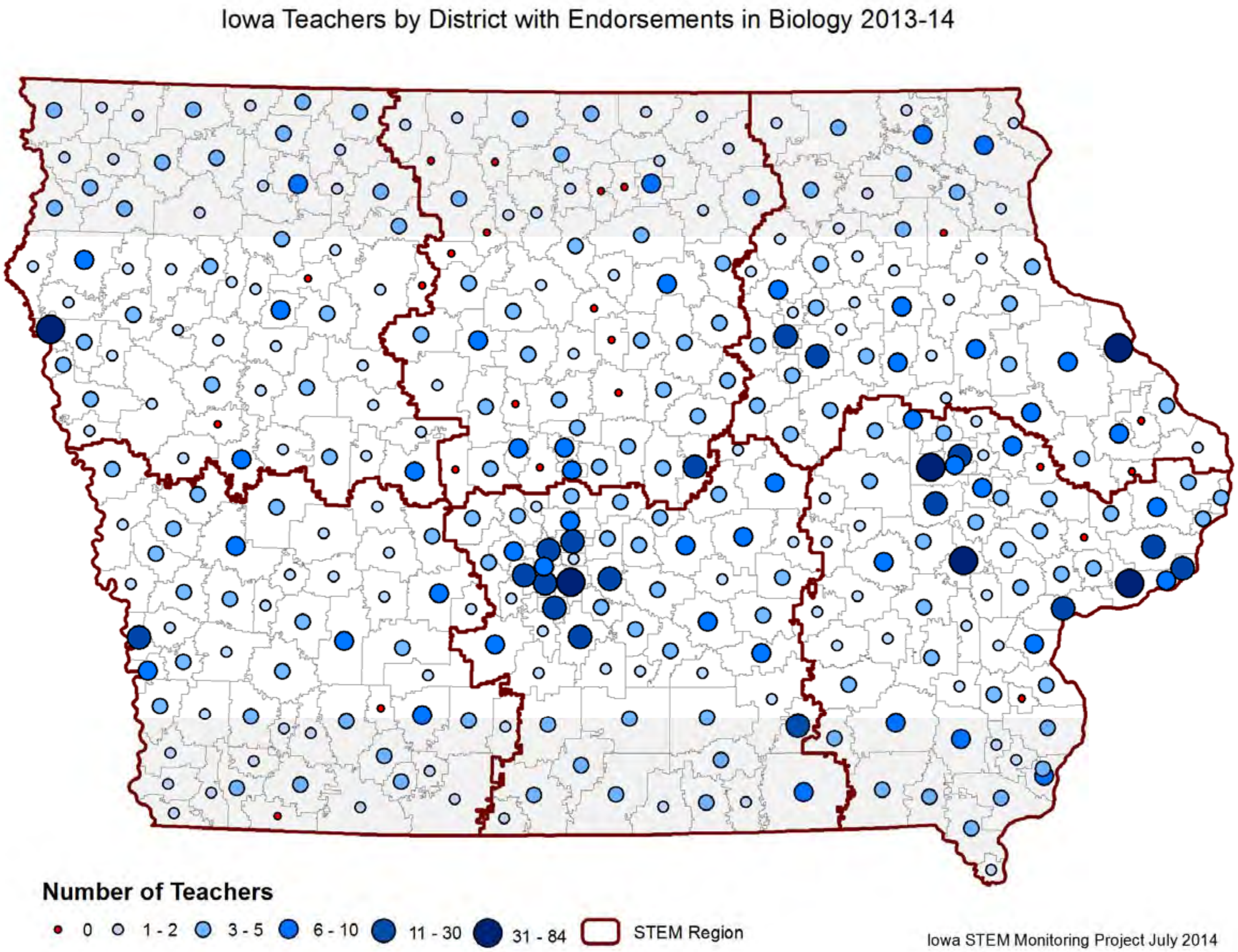


Figure 19. Iowa teachers by district with endorsements in biology, 2013-2014

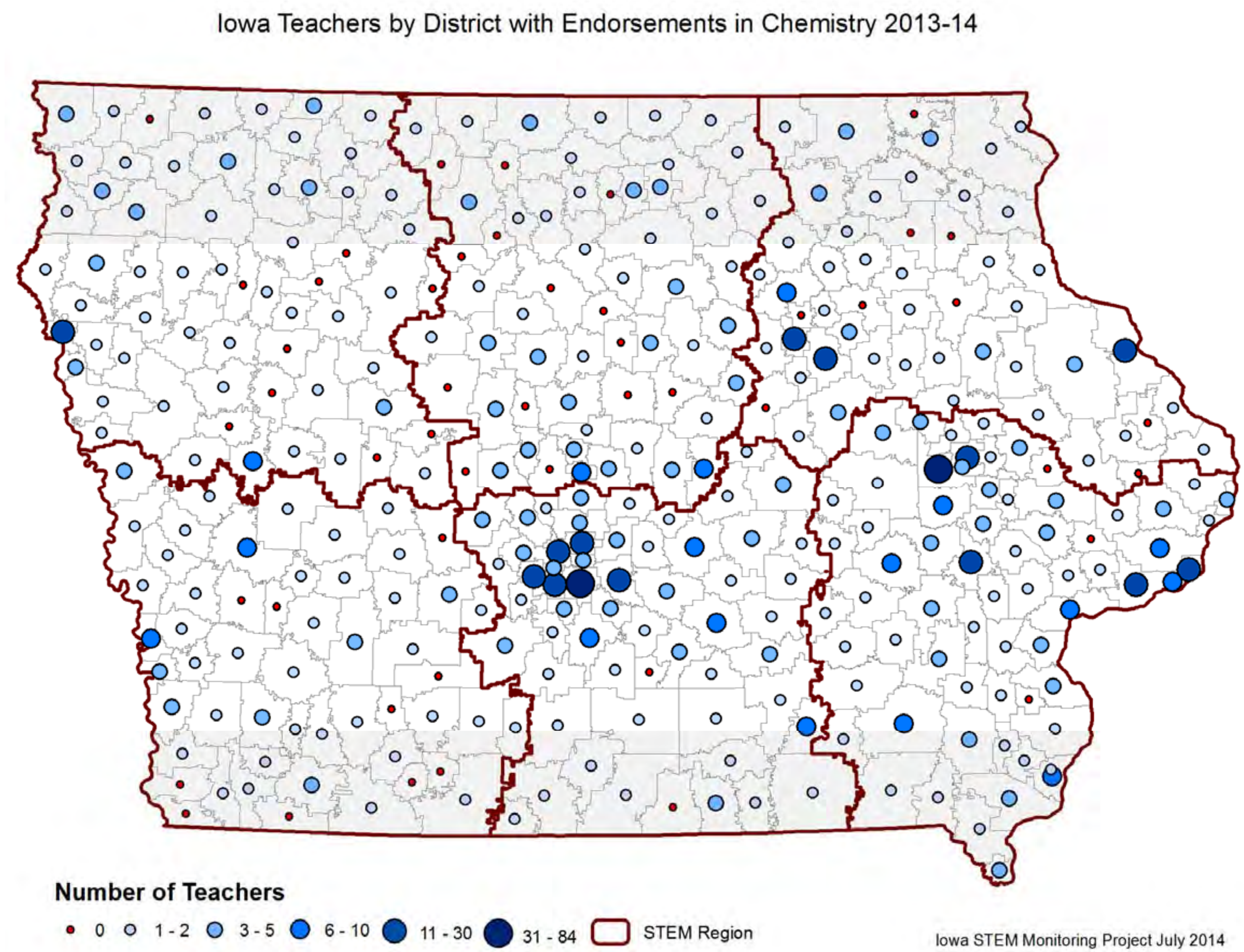


Figure 20. Iowa teachers by district with endorsements in chemistry, 2013-2014

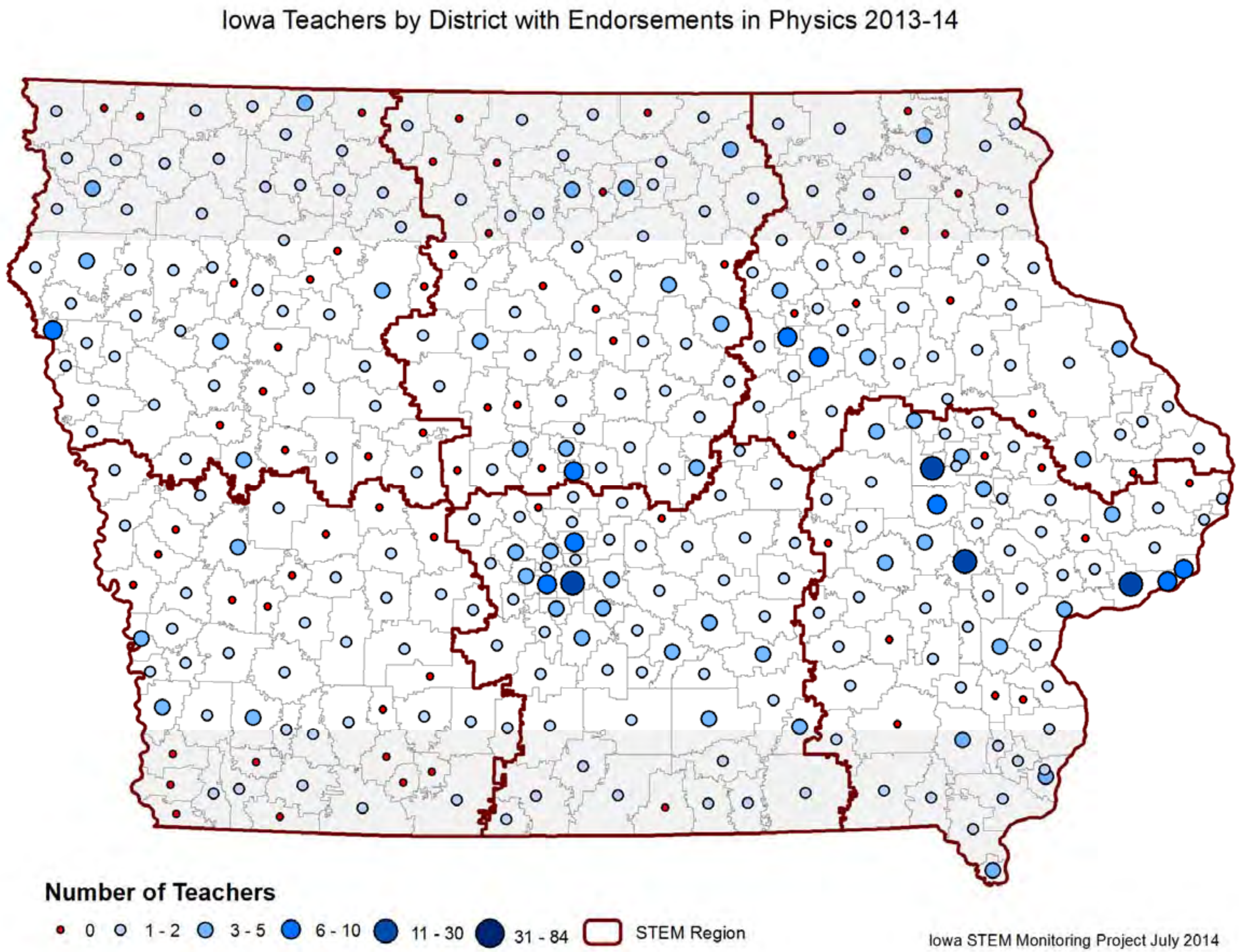


Figure 21. Iowa teachers by district with endorsements in physics, 2013-2014

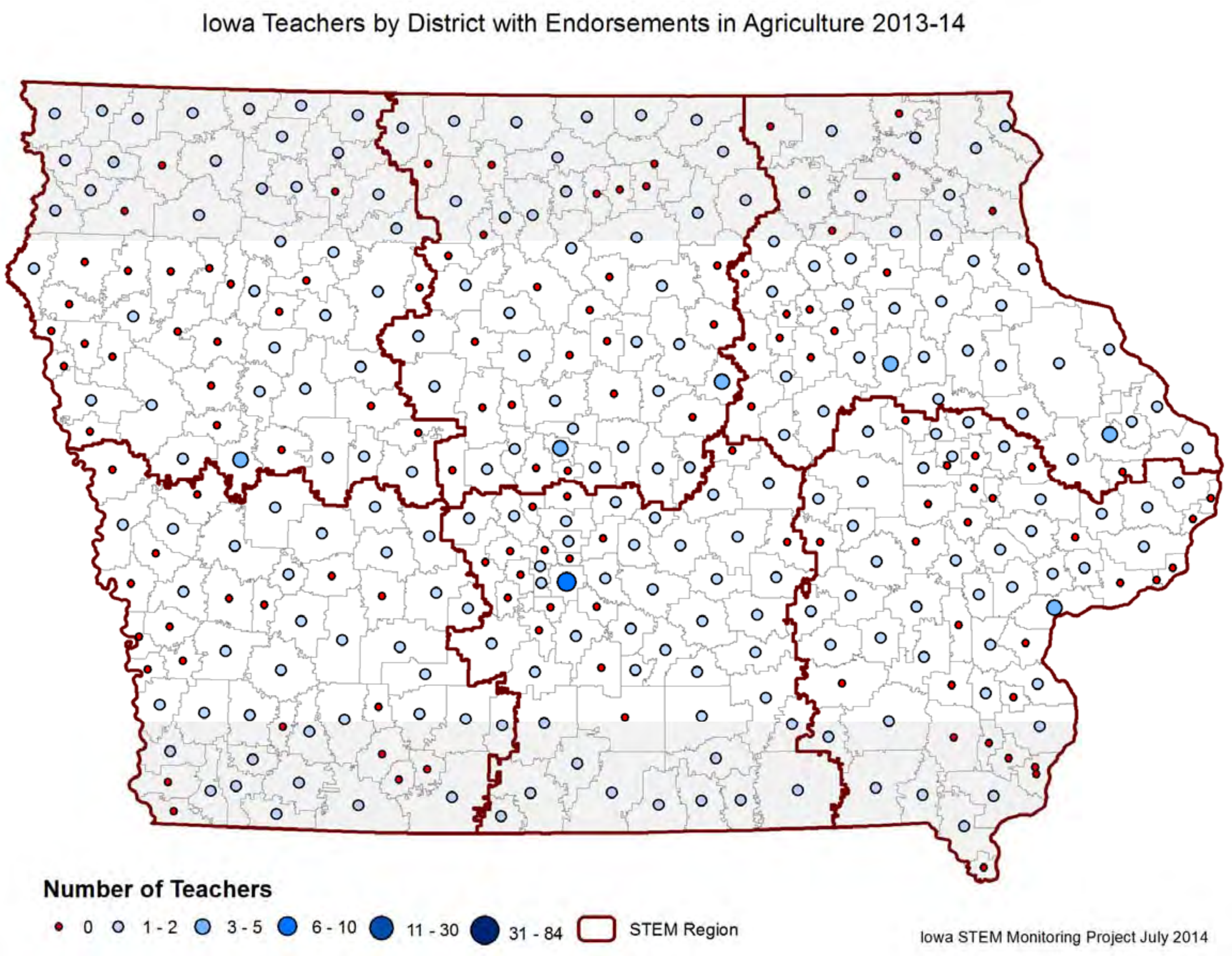


Figure 22. Iowa teachers by district with endorsements in agriculture, 2013-2014

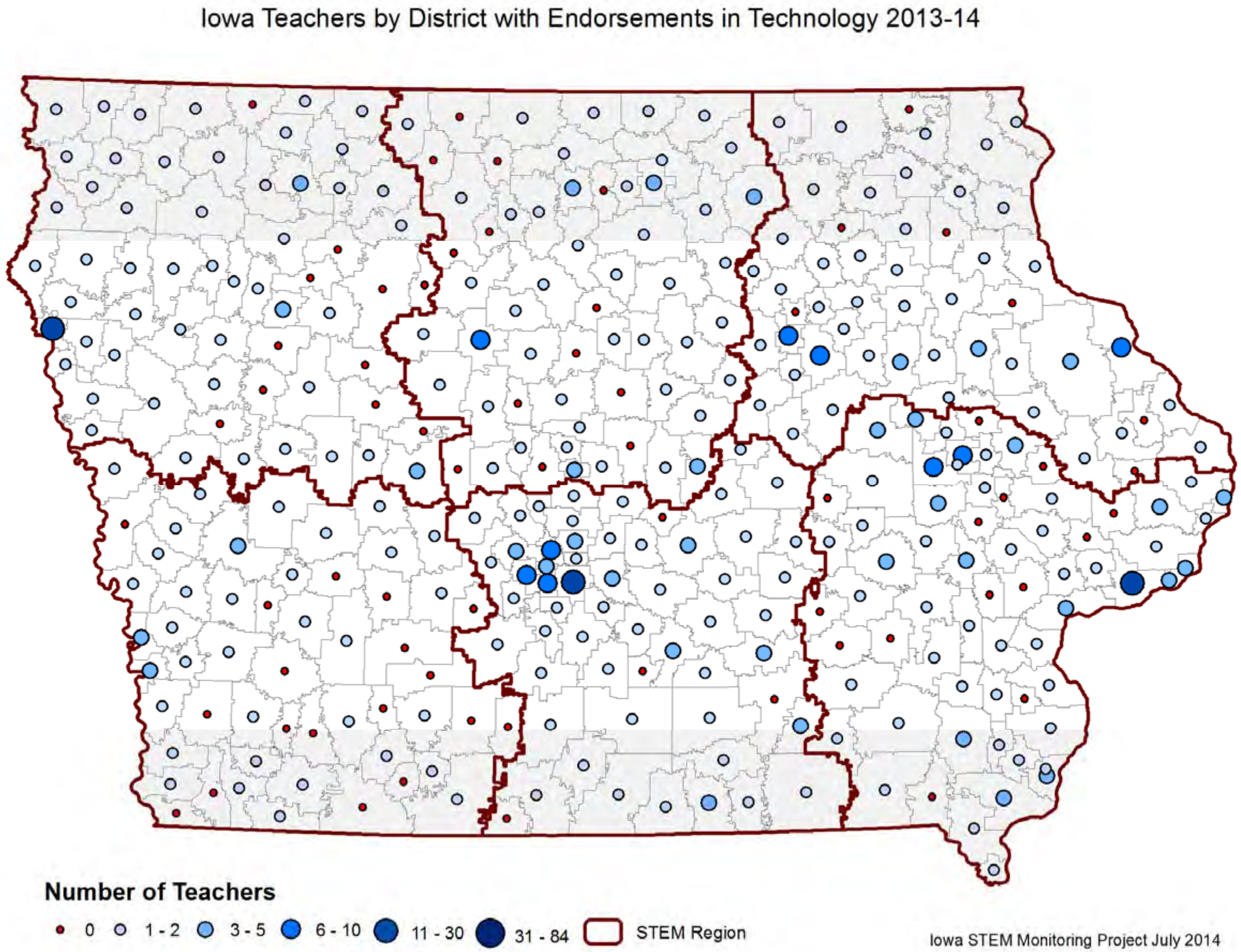


Figure 23. Iowa teachers by district with endorsements in technology, 2013-2014

Indicator 11: Number of beginning teachers recommended for licensure/endorsement in STEM-related subjects

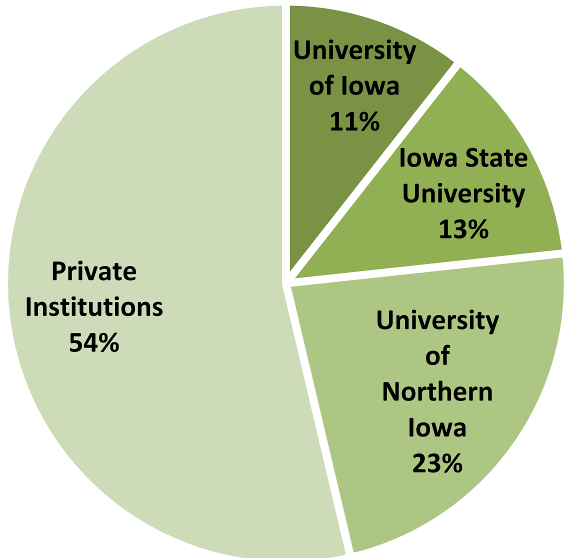
Data Source Iowa Board of Educational Examiners, July 2014

Indicator 11 explores the distribution of beginning teachers recommended for licensure by Iowa colleges and universities between 2008-2009 and 2013-14. Note that data collection for 2013-14 was still in progress at the time of this reporting; approximately 90% of the data are represented for 2013-14. Data regarding the total number of teachers recommended for licensure annually by Iowa colleges and universities is provided in this section to contextualize the STEM-subject-endorsed teacher data.

Figure 24 and Figure 25 provide a visual distribution of the 32 colleges and universities in Iowa that recommend teachers for licensure, as well as the percentage of new teachers recommended by each Iowa college/university and the percentage of new teachers with STEM-subject related endorsements recommended by each Iowa college/university.

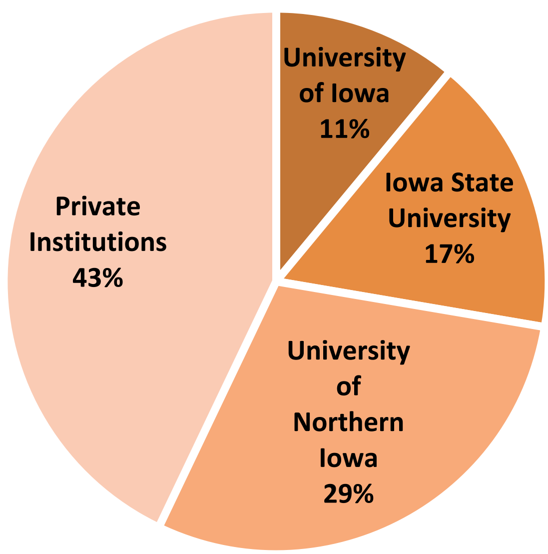
Key findings

- Between 2008-09 and 2012-13, the three Regents universities (University of Iowa, Iowa State University, and University of Northern Iowa) recommended approximately 40% of all newly prepared teachers for licensure, and the 29 private colleges and universities recommended approximately 60% of new teachers. Those numbers shifted slightly in 2013-14; the Regents institutions recommended 47% of all new teachers and the private colleges and universities recommended approximately 54% of new teachers (Figure 24).
- In contrast, between 2008-09 and 2012-13, the three Regents universities recommended approximately 60% of new teachers with at least one STEM-related endorsement, and the private colleges and universities recommended the other 40%. In 2013-14, those numbers also shifted slightly with the Regents universities responsible for the preparation of 57% of teachers with at least one STEM-related endorsement and the private colleges and universities responsible for the other 43% (Figure 25).



Data Source: Board of Educational Examiners, July 2014

Figure 24. Distribution of all candidates recommended for licensure by Iowa colleges and universities, 2013-14



Data Source: Board of Educational Examiners, July 2014

Figure 25. Distribution of candidates with a STEM-related endorsement recommended for licensure by Iowa colleges and universities, 2013-14

Throughout these six years, 29 private and three public colleges and universities in Iowa consistently prepared and recommended teachers for licensure (Table 18, Table 19, Figure 26).

Table 18. Number of candidates recommended for teacher licensure by Iowa colleges or universities

Program	Primary Location	08-09	09-10	10-11	11-12	12-13	13-14[1]
Ashford University	Clinton	18	18	17	22	25	28
Briar Cliff University	Sioux City	28	34	30	16	29	19
Buena Vista University	Storm Lake	122	146	136	140	157	102
Central College	Pella	46	40	42	57	53	44
Clarke College	Dubuque	41	43	49	43	36	36
Coe College	Cedar Rapids	30	37	50	30	37	27
Cornell College	Mt. Vernon	28	15	17	30	26	24
Dordt College	Sioux Center	50	59	61	55	59	52
Drake University	Des Moines	118	116	124	134	102	113
Emmaus Bible College	Dubuque	8	9	4	5	4	7
Faith Baptist Bible College	Ankeny	11	16	23	13	15	12
Graceland University	Lamoni	151	163	129	106	98	63
Grand View University	Des Moines	38	37	34	45	52	41
Grinnell College	Grinnell	8	6	9	6	6	4
Iowa State University	Ames	265	254	292	337	296	282
Iowa Wesleyan College	Mt. Pleasant	25	35	37	29	24	47
Kaplan University[2]	Davenport	10	22	28	9	0	8
Loras College	Dubuque	87	60	47	52	62	39
Luther College	Decorah	95	98	71	78	50	41
Maharishi Univ. of Management	Fairfield	1	1	3	3	0	2
Morningside College	Sioux City	53	57	65	59	49	48
Mount Mercy University	Cedar Rapids	35	37	31	40	43	27
Northwestern College	Orange City	56	63	45	53	60	56
Saint Ambrose University	Davenport	76	66	86	78	83	77
Simpson College	Indianola	71	55	91	77	74	77
University of Dubuque	Dubuque	34	31	41	34	33	21
University of Iowa	Iowa City	232	248	261	257	268	235
University of Northern Iowa	Cedar Falls	442	521	428	566	512	511
Upper Iowa University	Fayette	67	82	71	73	82	55
Waldorf College	Forest City	14	16	16	17	14	15
Wartburg College	Waverly	74	53	88	60	60	75
William Penn University	Oskaloosa	30	86	45	48	48	32
Total		**2,364**	**2,524**	**2,471**	**2,572**	**2,457**	**2,220**

Data Source: Iowa Board of Educational Examiners, July 2014
Note 1: Data collection for 2013-14 is still in progress. Approximately 80% of the data are reported in this table.
Note 2: Kaplan University's program is graduate-only and delivered online. There is no central Kaplan University office in the state of Iowa; Davenport represents the first Kaplan site in the state.

Table 19. Number of candidates with a STEM-related endorsement recommended for teacher licensure by Iowa colleges or universities

Program	Primary Location	08-09	09-10	10-11	11-12	12-13	13-14
Ashford University	Clinton	2	5	4	7	8	7
Briar Cliff College	Sioux City	0	5	3	5	4	7
Buena Vista University	Storm Lake	12	6	2	6	5	14
Central College	Pella	4	4	8	9	12	8
Clarke University	Dubuque	4	3	7	7	4	5
Coe College	Cedar Rapids	4	5	10	4	5	4
Cornell College	Mt. Vernon	3	2	2	3	7	2
Dordt College	Sioux Center	4	3	7	13	17	10
Drake University	Des Moines	25	13	16	17	17	25
Emmaus Bible College	Dubuque	-	-	-	-	-	-
Faith Baptist Bible College	Ankeny	-	-	-	-	-	-
Graceland University	Lamoni	4	8	9	2	4	7
Grand View University	Des Moines	3	7	5	7	7	11
Grinnell College	Grinnell	2	0	1	1	1	0
Iowa State University	Ames	64	54	78	80	86	74
Iowa Wesleyan College	Mt. Pleasant	3	2	6	1	2	6
Kaplan University[1]	Davenport	-	-	-	-	-	2
Loras College	Dubuque	10	7	5	3	10	9
Luther College	Decorah	2	7	5	4	7	7
Maharishi Univ of Management	Fairfield	2	0	0	0	0	0
Morningside College	Sioux City	10	8	9	12	8	13
Mount Mercy University	Cedar Rapids	4	3	0	8	7	6
Northwestern College	Orange City	4	8	4	12	10	9
Saint Ambrose College	Davenport	12	8	9	12	18	11
Simpson College	Indianola	17	8	7	17	12	15
University of Dubuque	Dubuque	5	3	2	8	4	4
University of Iowa	Iowa City	59	52	64	55	59	49
University of Northern Iowa	Cedar Falls	67	97	88	162	119	132
Upper Iowa University	Fayette	3	4	7	6	4	2
Waldorf College	Forest City	3	5	0	5	2	1
Wartburg College	Waverly	16	8	17	16	15	17
William Penn University	Oskaloosa	3	3	7	10	2	6
Total		**351**	**338**	**382**	**492**	**456**	**463**

Data Source: Iowa Board of Educational Examiners, July 2014
Note 1: Data collection for 2013-14 is still in progress. Approximately 80% of the data are reported in this table.
Note 2: Kaplan University’s program is graduate-only and delivered online.
There is no central Kaplan University office in the state of Iowa; Davenport represents the first Kaplan site in the state.

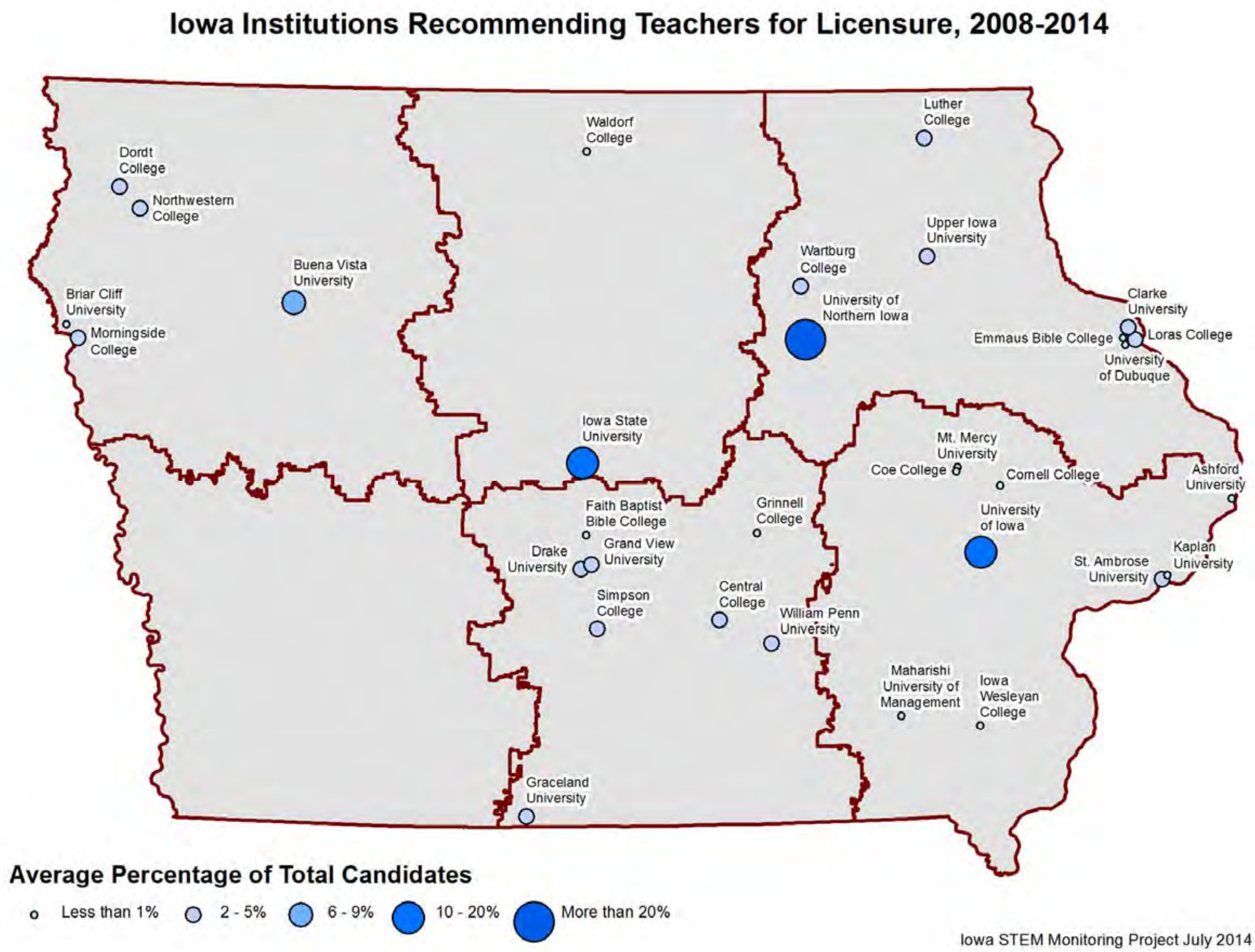


Figure 26. Iowa Institutions recommending teachers for licensure, 2008-2014

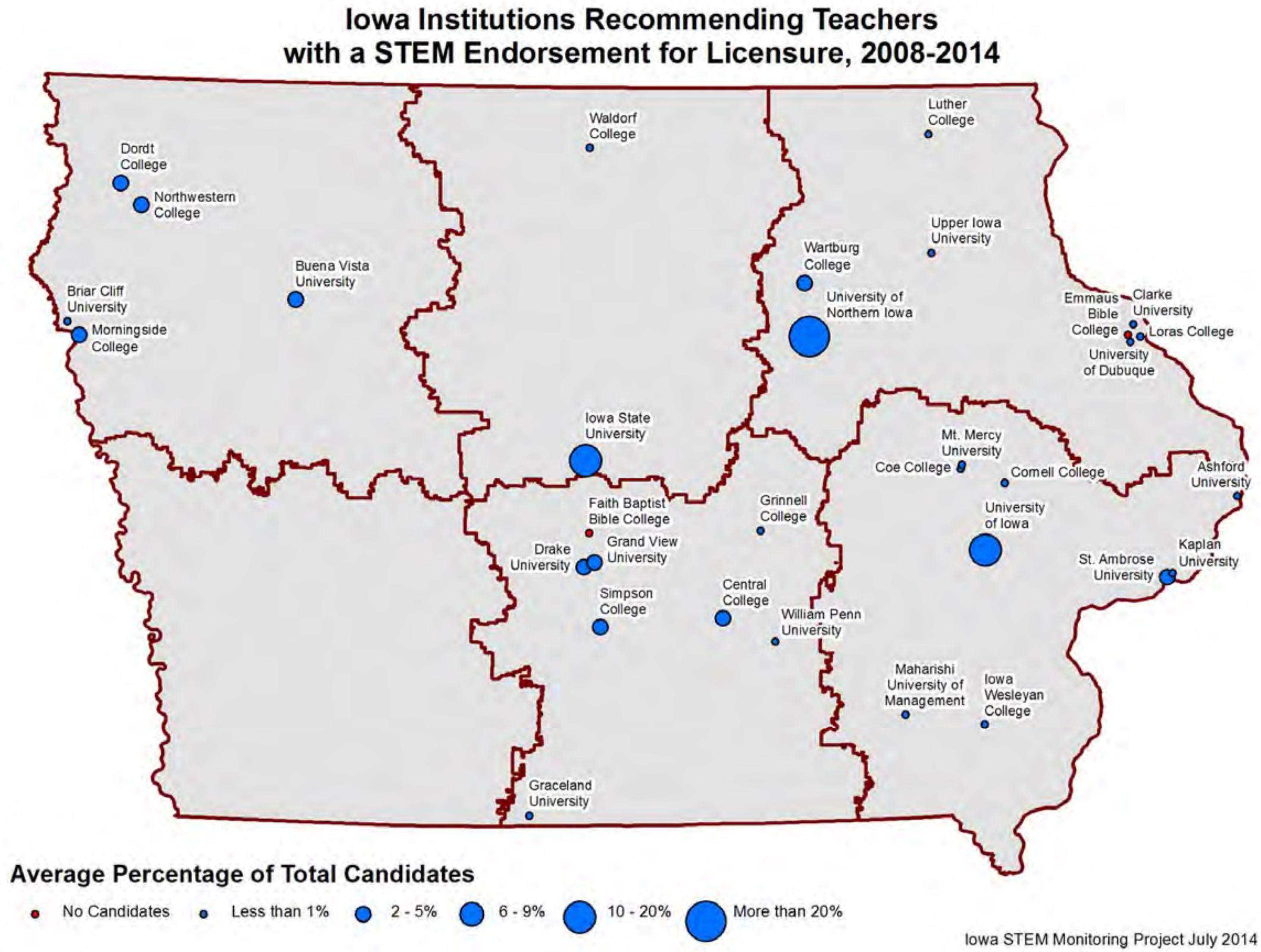


Figure 27. Iowa institutions recommending teachers with a STEM-related endorsement for licensure, 2008-2014

Indicator 12: Teacher retention in STEM-related subjects

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

Indicator 12 examines the retention of beginning teachers in Iowa who teach advanced high school STEM-related courses. As of 2013-14, four cohorts of teachers have been examined: Cohort 1 began their employment in fall 2010; Cohort 2 began in fall 2011; Cohort 3 began in fall 2012; Cohort 4 began in fall 2013. These cohorts will continue to be monitored each year with an additional cohort added each year, eventually producing a five-year retention rate of new STEM-related high school teachers.

Key findings

Table 20 shows the number of new Iowa high school STEM teachers in the initial year of employment, as well as the number of teachers retained in subsequent years.

- In 2010-11, there were 73 new teachers hired to teach advanced high school STEM-subject courses. Three years later, less than half of those teachers were still teaching advanced high school STEM-subject courses.
- Of the 66 new teachers hired to teach in 2011-12, 42 returned to teach advanced STEM-subject courses in 2013-14 school year.
- In 2012-13, there were 92 new teachers hired to teach advanced high school STEM-subject courses and 69 teachers returned for a second year. In the most recent year, 2013-14, there were 59 new teachers hired to teach advanced high school STEM-subject courses. This is the smallest cohort of new teachers since we began monitoring new teacher retention.

Table 20. Number of beginning high school STEM teachers retained by academic year

	2010-2011	2011-12	2012-2013	2013-14
Cohort 1	73	57	47	36
Cohort 2	*	66	51	42
Cohort 3	*	*	92	69
Cohort 4	*	*	*	59

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

Note 1: No data were reported for Lisbon Community School District for academic years 2010-11, 2011-12, and 2012-13.
Note 2: No data were reported for Northeast Hamilton School District for 2013-14.

Table 21 shows the retention rate of beginning high school STEM-related teachers by cohort.

- Initial analysis of the current data shows that, across three cohorts, the average one-year retention rate of beginning high school STEM-related teachers in the state of Iowa is 76.6%. In other words, almost 25% of beginning high school STEM-related teachers do not return for a second year of teaching advanced high school STEM-subject courses.
- The average two-year retention rate of new teachers responsible for advanced high school STEM-subject courses is 64%.
- Cohort 1 is the only group currently reporting a three-year retention rate, which is 49.3%.

Table 21. Retention rates of beginning high school STEM teachers by cohort

	One-Year Retention	**Two-Year Retention**	**Three-Year Retention**
Cohort 1 (2010-11)	78.1%	64.4%	49.3%
Cohort 2 (2011-12)	77.2%	63.6%	*
Cohort 3 (2012-13)	75.0%	*	*

Data source: Iowa Department of Education, Bureau of Information and Analysis Services, Basic Educational Data Survey (BEDS)
Note 1: No data were reported for Lisbon Community School District for 2010-11, 2011-12, 2012-13.
Note 2: No data were reported for Northeast Hamilton School District for 2013-14.

It is important to note that of the teachers not retained each year, not all left the teaching profession completely. Approximately half of those teachers were still employed as public school teachers in Iowa but had either switched to teaching middle school or were no longer teaching advanced STEM-subject courses in high school. The data do not indicate why these teachers moved to new teaching assignments. It is possible that some shifted no because they specifically wished to stop teaching in STEM areas, but because they were assigned different courses by admninistrators.

Indicator 13: Enrollment in STEM-related courses in high school

Data source Iowa Department of Education, Bureau of Information and Analysis Services, 2014

Indicator 13 investigates the opportunities available for Iowa students to take basic and advanced level STEM courses in high school.

Key findings

Table 22 provides the number of students statewide enrolled in each STEM-related subject area over a five-year period.

- Since 2009-10, enrollment has increased in science, math, engineering, and health courses. Specifically, enrollment in science and math courses has increased by 2.2% and 7.8%, respectively, and enrollment in health courses has increased by 29%.
- The most significant increase in student enrollment is in the area of engineering which has increased by 68% since 2009-10.
- The gender composition in each subject area continues to remain relatively stable in math and science courses, with males and females each comprising approximately half of the enrollment. However, technology and engineering continue to enroll a greater proportion of male students while health courses have a greater proportion of female students. Specifically, technology courses enrolled twice as many males as females, and engineering courses enrolled approximately 85% males and 15% females. Conversely, females compromised almost 70% of the enrollment in health courses.

Table 22. Student enrollment in high school STEM courses

	Net Change	2009-10	2010-11	2011-12	2012-13	2013-14
Science	**+2.2%**	**72,428**	**72,114**	**73,150**	**73,633**	**73,996**
Male		49.4%	49.8%	49.5%	49.6%	49.7%
Female		50.6%	50.2%	50.5%	50.4%	50.3%
Math	**+7.8%**	**47,481**	**46,934**	**47,563**	**49,602**	**51,210**
Male		49.3%	49.1%	49.3%	49.5%	49.5%
Female		50.7%	50.9%	50.7%	50.5%	50.5%
Technology	**-18.6%**	**8,644**	**7,647**	**7,818**	**7,791**	**7,032**
Male		65.5%	64.2%	66.9%	69.2%	71.1%
Female		34.5%	35.8%	33.1%	30.8%	28.9%
Engineering	**+68.0%**	**5,327**	**6,386**	**7,303**	**7,954**	**8,952**
Male		84.9%	83.7%	84.1%	83.6%	83.5%
Female		15.1%	16.3%	15.9%	16.4%	16.5%
Health	**+29.1%**	**289**	**278**	**343**	**412**	**373**
Male		31.1%	25.2%	26.2%	31.3%	31.6%
Female		68.9%	74.8%	73.8%	68.7%	68.4%

Data Source: Iowa Department of Education, Bureau of Information and Analysis Services, 2014

Further analysis was conducted regarding female enrollment in math and science courses by district for each academic year. Female enrollment in high school math and science courses was compared to total number of females in each district, creating a five point categorical scale to express course enrollment relative to population – *far fewer girls, fewer girls, balanced, more girls,* and *far more girls*. Districts that fell in the balanced category were within one standard deviation of the mean. Districts labeled as having fewer girls were between one and two standard deviations *below* the mean while districts with far fewer girls were more than two standard deviations *below* the mean. Conversely, districts identified as having more girls were between one and two standard deviations *above* the mean while districts with far more girls were more than two standard deviations *above* the mean.

The female enrollment data are displayed in both tables and maps. Table 23 and Table 24 show the distribution of school districts across the five categories for both math and science for each of the five years. Figures 28-37 display the data visually by school district, content area, and year.

- Approximately 70% of the school districts have a balanced enrollment of females in math and science courses relative to their district female population while the other 30% of school districts enrolled females in math and science courses either above or below their female district population.
- There are no geographic trends relative to the districts that enroll far fewer or far more girls in math and science courses. As the maps show, these districts are distributed throughout the state and across STEM regions.

Table 23. Distribution of Iowa school districts: High school female s*cience* enrollment relative to female population

	2009-10	**2010-11**	**2011-12**	**2012-13**	**2013-14**
Far Fewer Girls	7	6	6	7	4
Fewer Girls	29	36	31	33	28
Balanced	255	238	240	236	242
More Girls	27	33	30	26	30
Far More Girls	10	11	11	13	10
No Females Enrolled/WGS	20	24	30	33	32

Data Source: Iowa Department of Education, Bureau of Information and Analysis Services, 2014

Table 24. Distribution of Iowa school districts: High school female *math* enrollment relative to female population

	2009-10	**2010-11**	**2011-12**	**2012-13**	**2013-14**
Far Fewer Girls	3	11	9	2	7
Fewer Girls	34	30	24	27	19
Balanced	249	241	246	251	248
More Girls	34	36	29	27	28
Far More Girls	8	8	10	8	11
No Females Enrolled/WGS	20	22	30	33	33

Data Source: Iowa Department of Education, Bureau of Information and Analysis Services, 2014

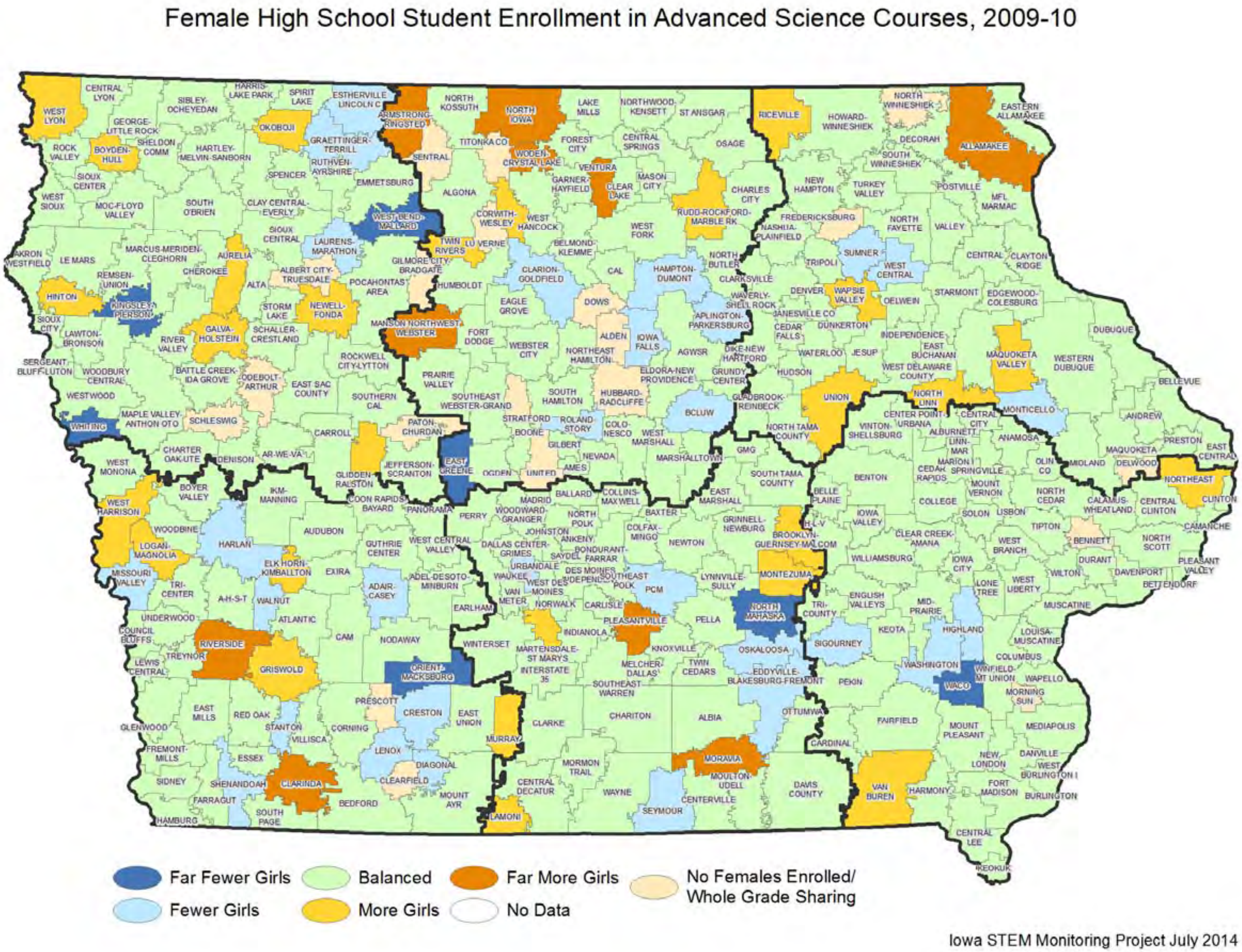


Figure 28. Female high school student enrollment in advanced science courses, 2009-2010

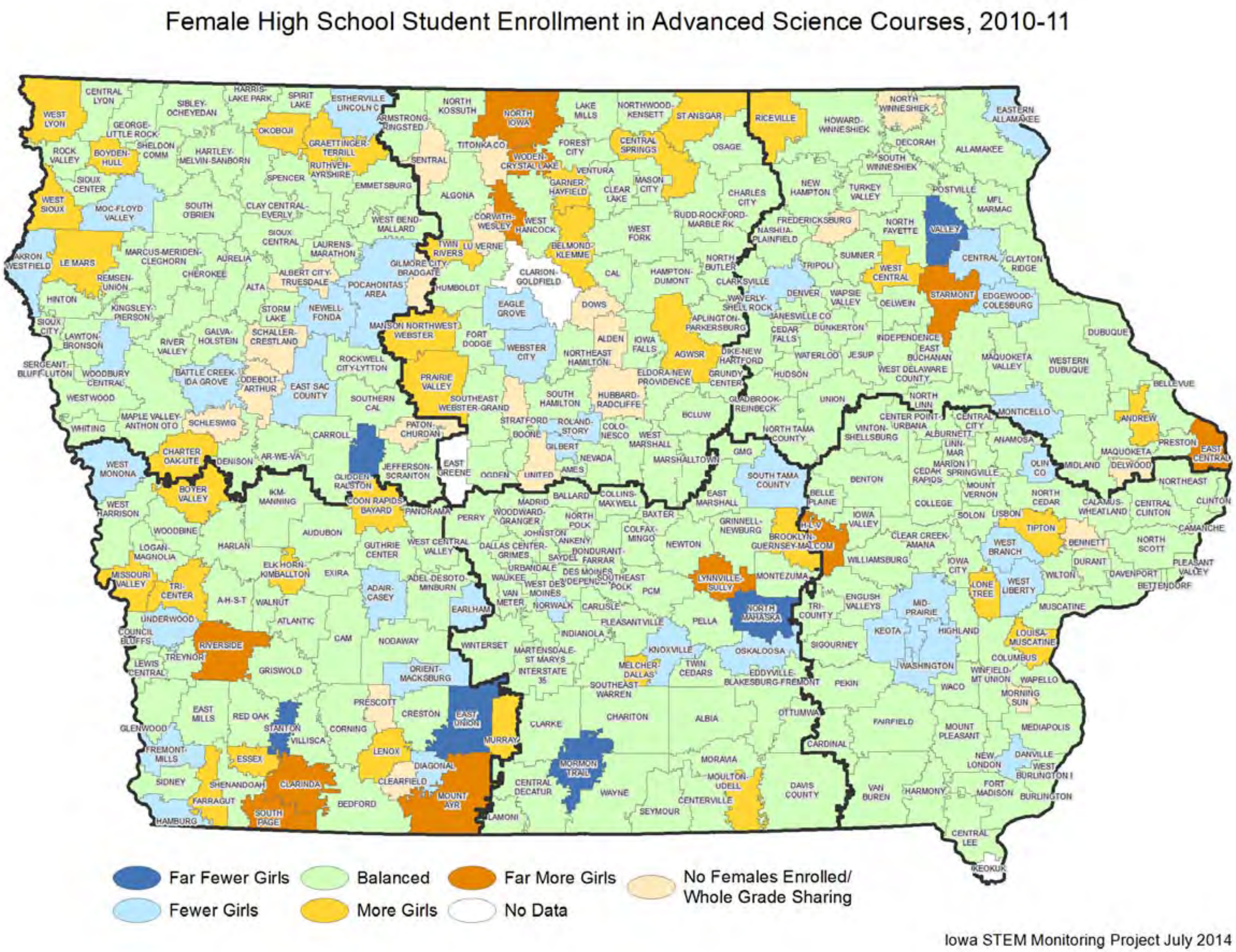


Figure 29. Female high school student enrollment in advanced science courses, 2010-2011

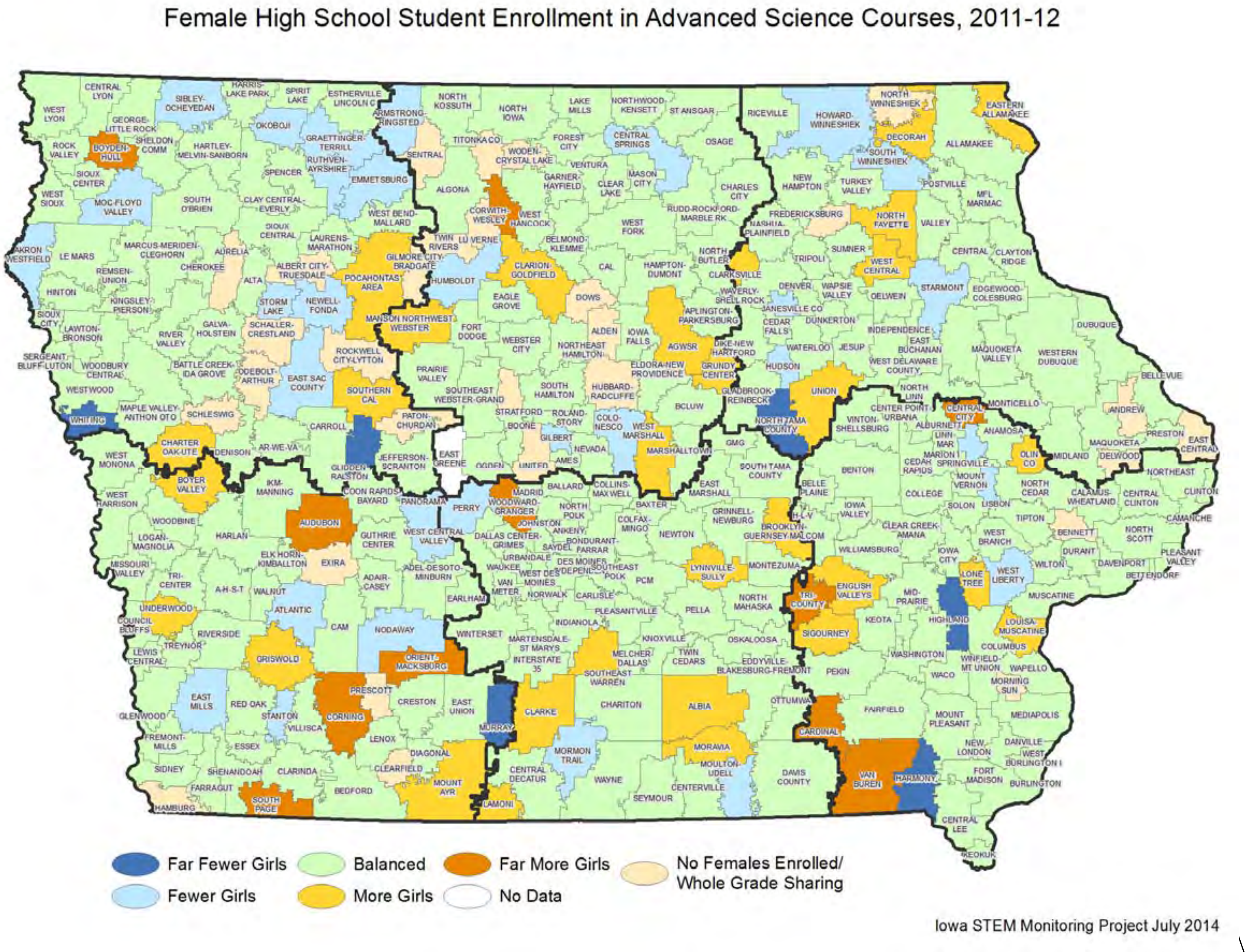


Figure 30. Female high school student enrollment in advanced science courses, 2011-2012

Female High School Student Enrollment in Advanced Science Courses, 2012-13

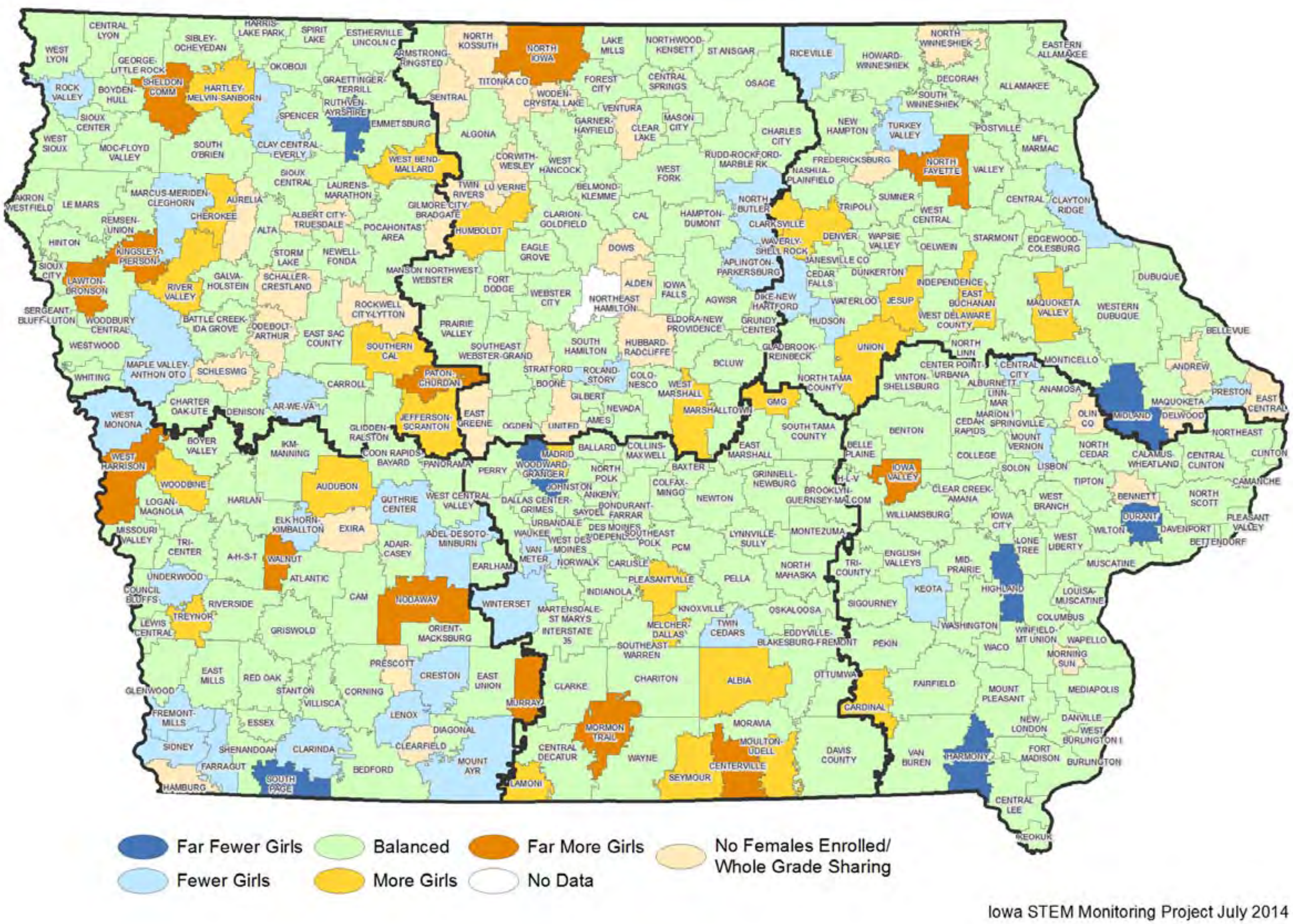


Figure 31. Female high school student enrollment in advanced science courses, 2012-2013

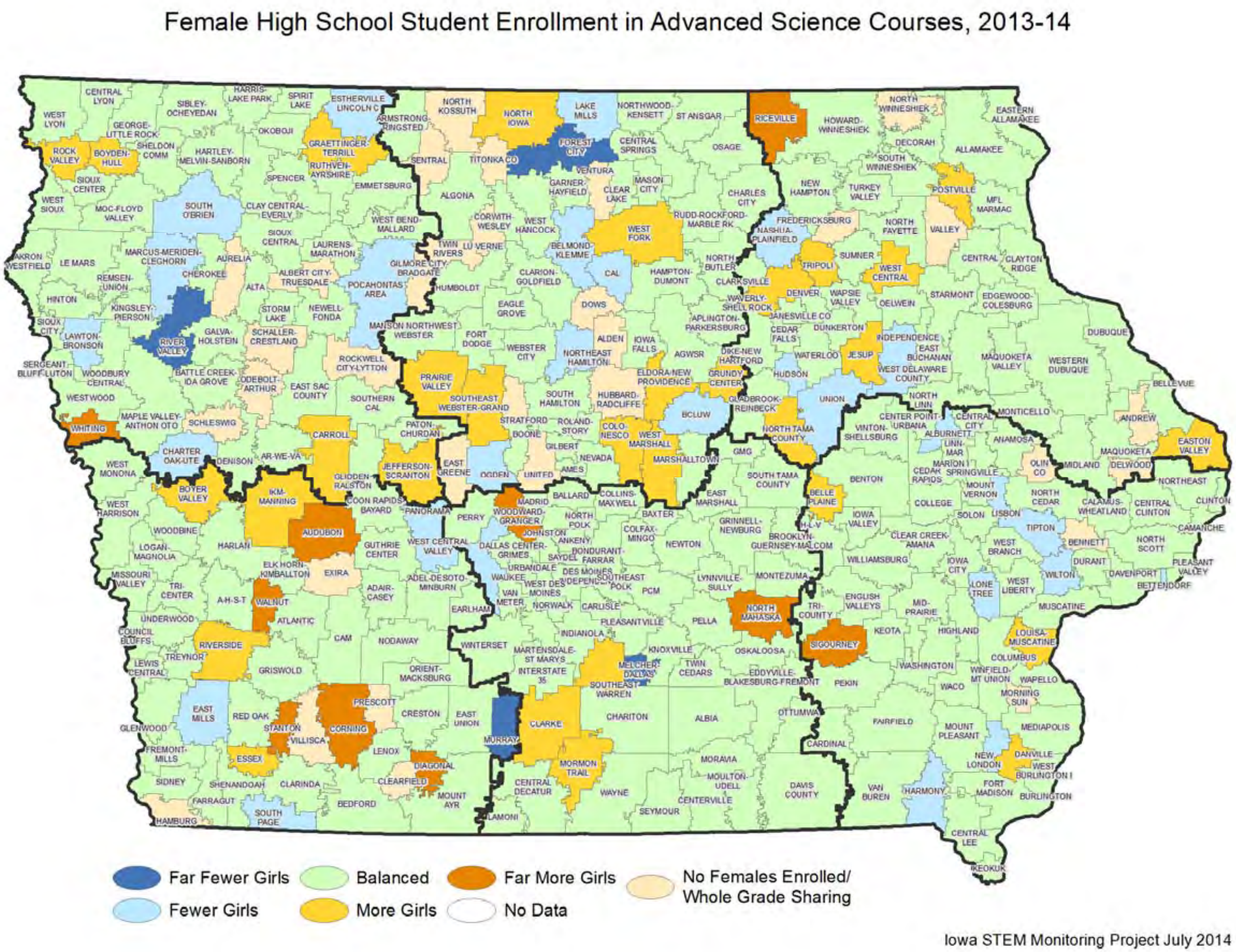


Figure 32. Female high school student enrollment in advanced science courses, 2013-2014

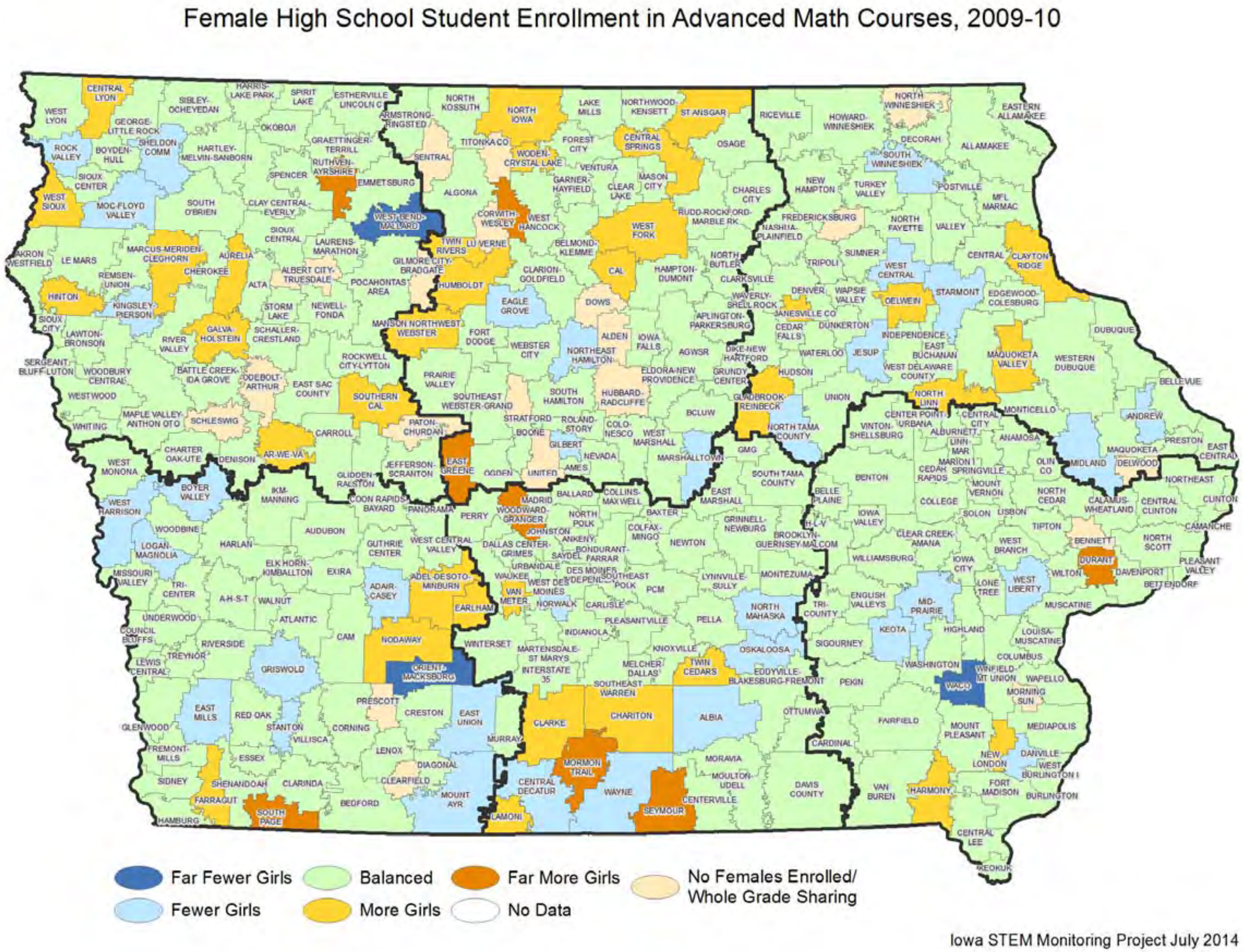


Figure 33. Female high school student enrollment in advanced math courses, 2009-2010

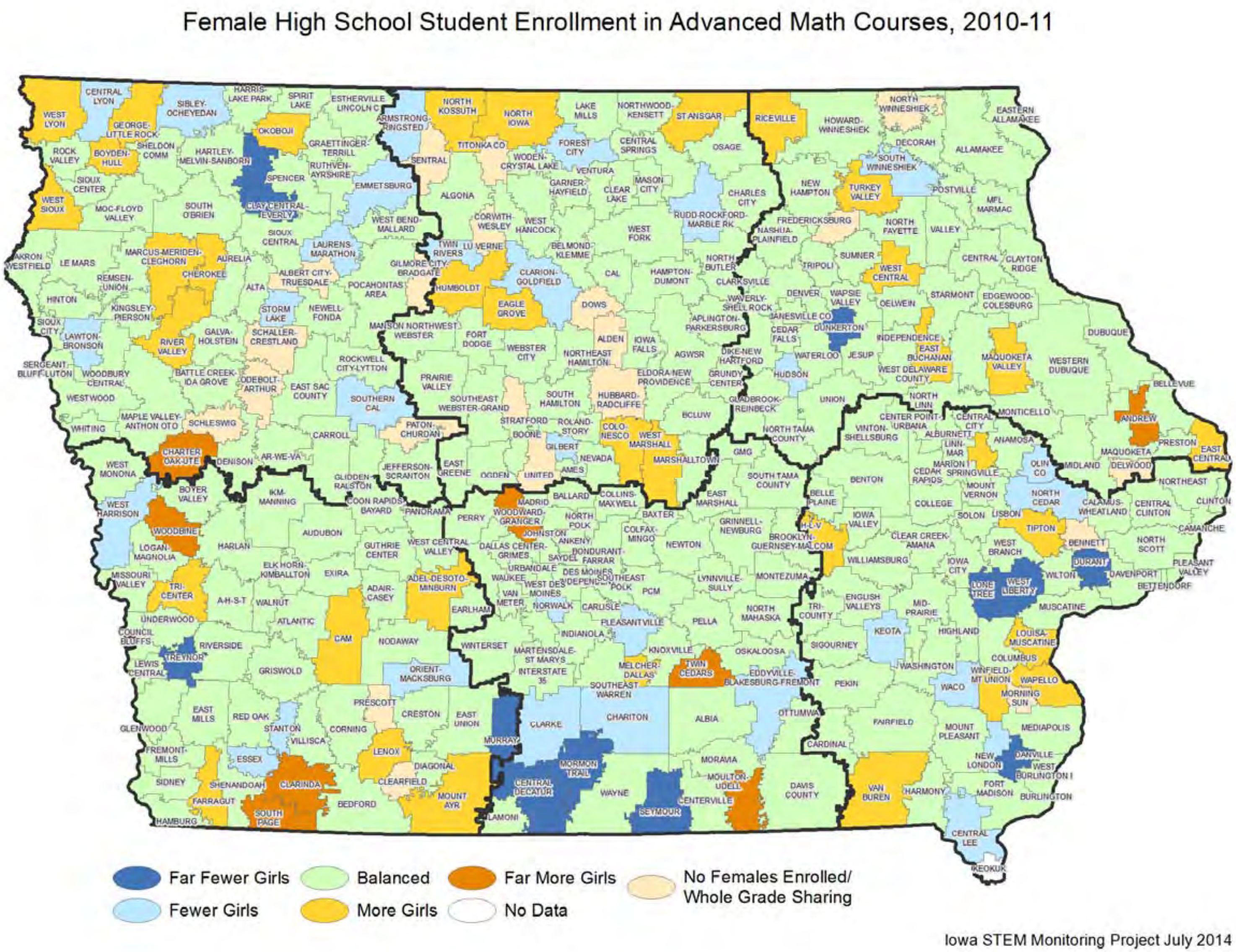


Figure 34. Female high school student enrollment in advanced math courses, 2010-2011

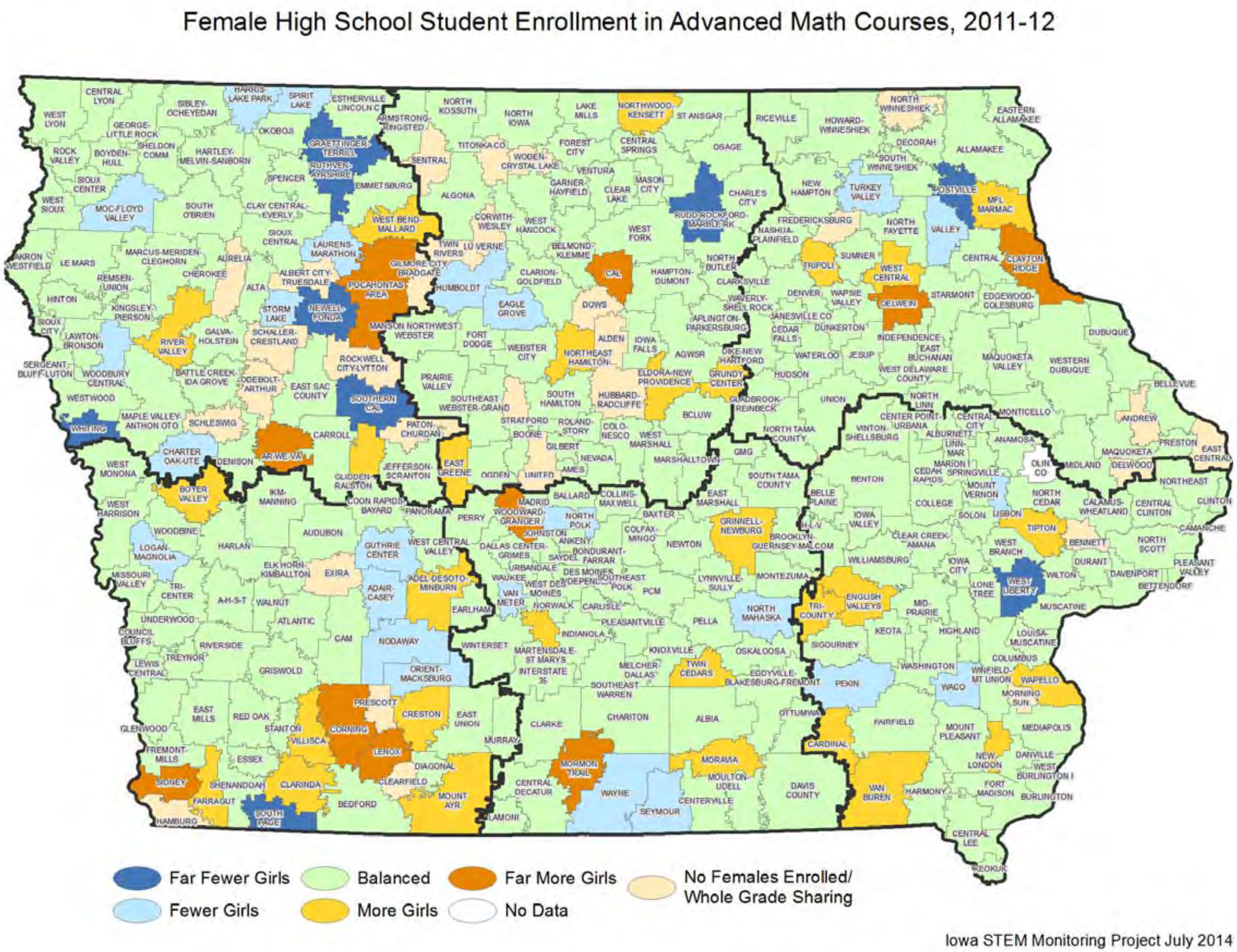


Figure 35. Female high school student enrollment in advanced math courses, 2011-2012

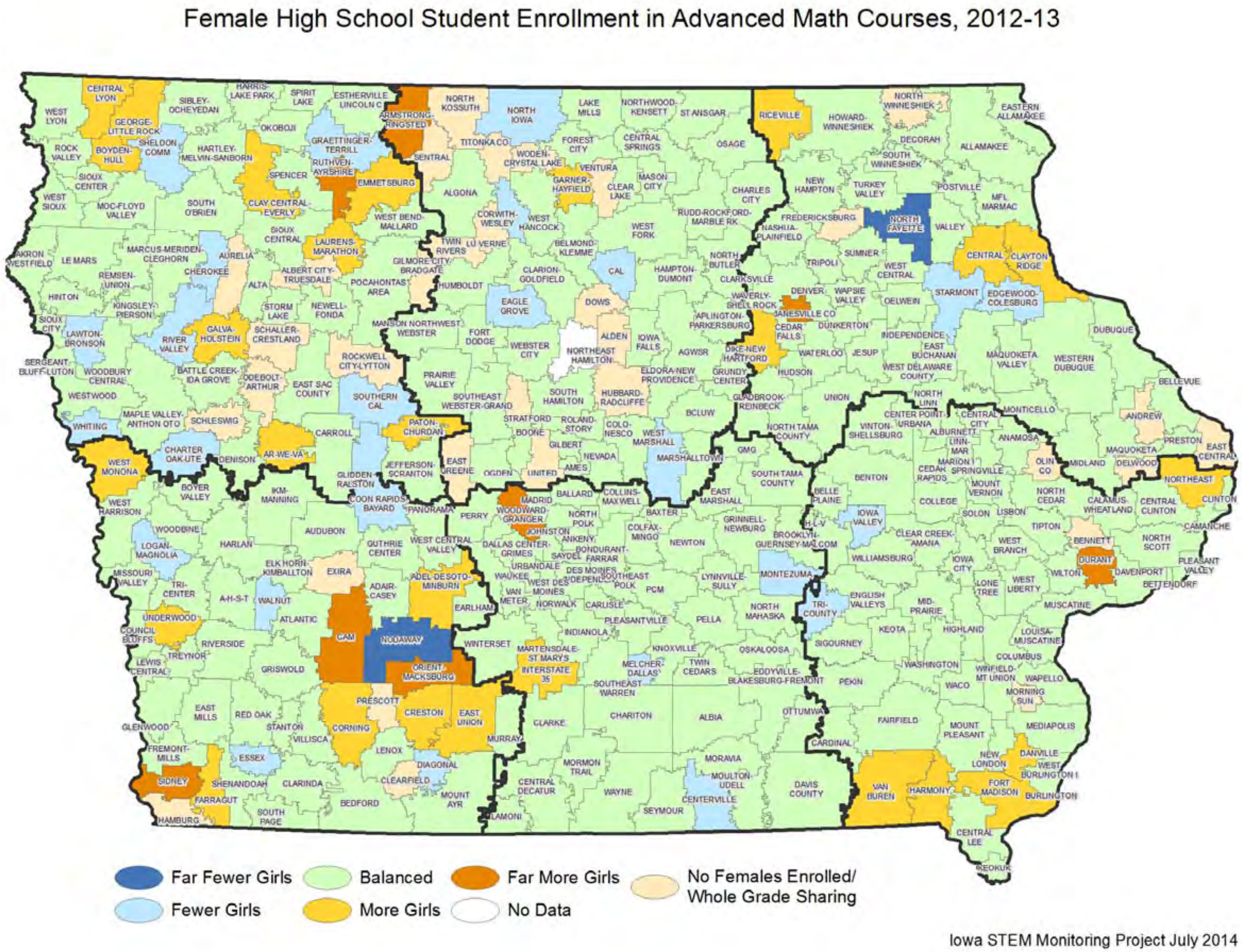


Figure 36. Female high school student enrollment in advanced math courses, 2012-2013

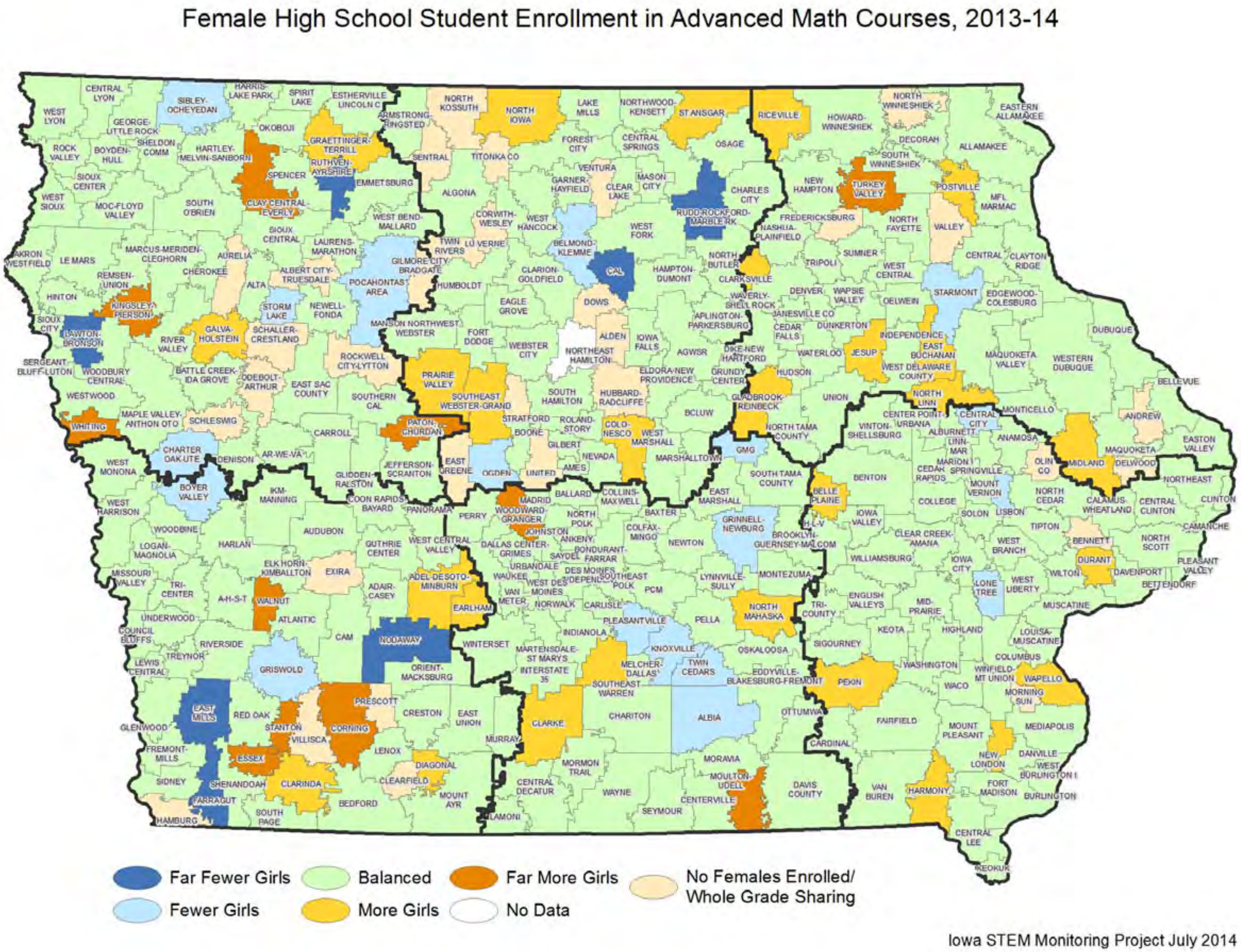


Figure 37. Female high school student enrollment in advanced math courses, 2013-2014

Revised!

Indicator 14: Community college awards in STEM fields

Note: This is a revised indicator for the 2014 report.

Data source Iowa Department of Education, Division of Community Colleges

Awards include diplomas, certificates, Associate’s degrees, and “other” awards as identified and classified by the Iowa Department of Education Division of Community Colleges. The Iowa Department of Education classifies career and technical education programs into occupational “career clusters,” following the National Career Clusters Framework. Three of these (health sciences, information technology, and STEM) are tracked for the purposes of indicators 14.

Key findings

- The total number of awards granted by community colleges in STEM-related fields increased by 10% between 2009 and 2013 (Table 25).
- The number of awards conferred upon females increased by 2% in the health sciences, 74% in information technology, and 5% in STEM. Change in the number of female awards during the 2009-2013 time period outpaced that of males in information technology and STEM, but not in health sciences, where the number of awards to males increased by 74%.
- The number of awards conferred upon minority students increased dramatically between 2009 and 2013. In all three career clusters tracked here, awards to minorities increased by over 150% and up to 221%.

Table 25. Community college awards by career cluster

	2009	2010	2011	2012	2013	% Change 2009-2013
Health Science						
Total	3,858	4,563	4,696	4,920	4,173	+ 8%
Male	321	381	574	545	561	+ 74%
Female	3,518	4,097	4,122	4,375	3,584	+ 2%
White	3,450	3,731	3,806	3,932	3,336	- 3%
Minority	220	275	324	379	706	+221%
Information Technology						
Total	360	329	405	551	490	+ 36%
Male	294	265	316	418	374	+ 27%
Female	65	63	89	133	113	+ 74%
White	308	265	316	367	330	+7%
Minority	21	28	26	34	61	+ 190%
Science, Technology, Engineering, and Mathematics						
Total	92	98	107	88	78	- 15%
Male	45	73	67	43	45	--
Female	21	20	40	45	22	+ 5%
White	63	58	74	49	53	- 16%
Minority	3	18	9	21	8	+ 167%
TOTAL	**12,639**	**14,264**	**14,971**	**15,900**	**13,934**	**+ 10%**

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

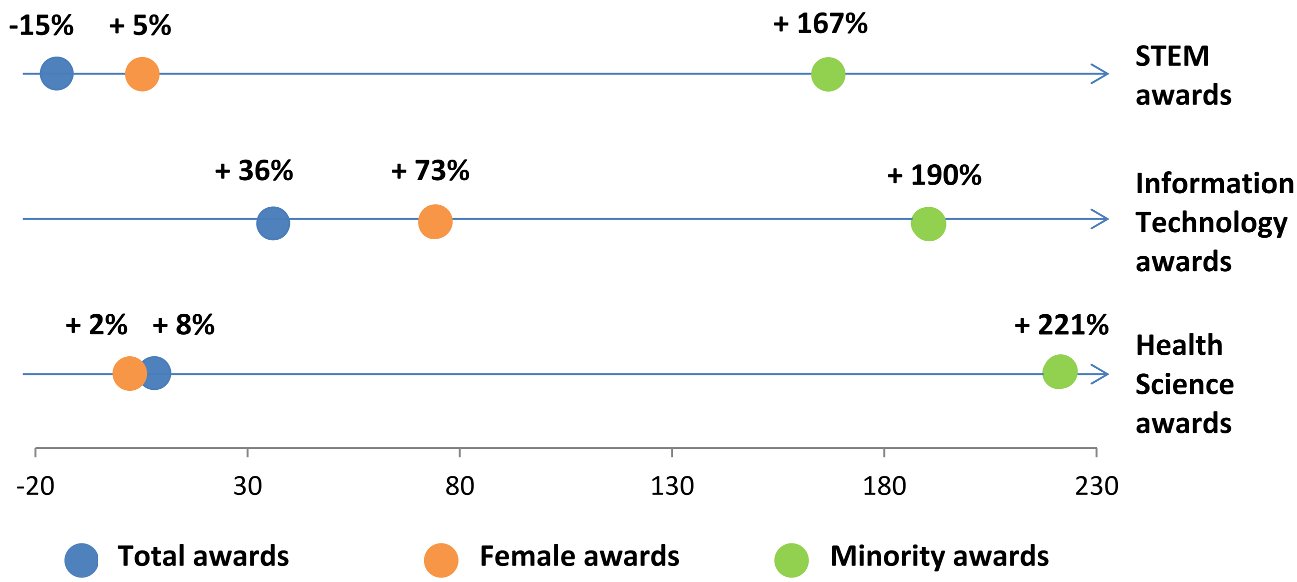


Figure 38. Percentage change in number of awards in STEM-related career clusters at community colleges, 2009-2013

Revised!

Indicator 15: College and university enrollment and degrees in STEM fields

Note This is a revised indicator for the 2014 report. This includes enrollment, bachelor's degrees, master's degrees, and doctoral degrees conferred by 4-year public universities, private non-profit colleges, and private for-profit colleges.

Data source Integrated Postsecondary Education Data System (IPEDS)

Key findings

Enrollment

- Fall enrollments have increased across all fields of study from 1996 to 2012 (27% change), although enrollments in medical doctor (MD) programs have decreased (-25% change). Minority enrollment has increased significantly (over 100% change) from 1996-2012 in most fields of study, as has enrollment among females.

Degrees

- Degrees granted to minorities in STEM-related fields of study have increased from 2010-2012; however, the vast majority of STEM-related degrees are granted to White students (61% of total awards). It appears as though female participation in STEM has increased, but when degrees granted to females in STEM fields are examined without health professions (including registered nurses, nursing administrators, and licensed practical/vocational nurses), women are only granted 34% of the total STEM awards (Table 26).

Table 26. Number of degrees at four-year colleges and universities

	2009-10	2010-11	2011-12	% Change 2010-2012
Communication Technologies				
Total	27	34	31	15%
Male	13	17	15	15%
Female	14	17	16	14%
White	5	32	28	460%
African American/Black	0	0	0	
Hispanic	6	8	0	-100%
Computer and Information Sciences				
Total	888	1,168	1,386	56%
Male	1,042	864	680	-35%
Female	326	304	208	-36%
White	88	579	408	364%
African American/Black	8	20	41	413%
Hispanic	1	0	26	2,500%
Engineering				
Total	1,510	1,578	1,637	8%
Male	1,353	1,270	1,264	-7%
Female	284	308	246	-13%
White	303	1,125	1,137	275%
African American/Black	23	22	29	26%
Hispanic	15	42	34	127%
Biological and Biomedical Sciences				
Total	1,338	1,312	1,462	9%
Male	631	567	585	-7%
Female	831	745	753	-9%
White	350	1,016	1,136	225%
African American/Black	15	27	35	133%
Hispanic	2	9	36	1,700%
Mathematics and Statistics				
Total	352	387	432	23%
Male	228	234	202	-11%
Female	204	153	150	-26%
White	84	254	295	251%
African American/Black	5	4	6	20%
Hispanic	18	43	4	-78%

	2009-10	2010-11	2011-12	% Change 2010-2012
Physical Sciences				
Total	299	396	408	36%
Male	272	274	196	-28%
Female	136	122	103	-24%
White	74	280	301	307%
African American/Black	0	2	7	
Hispanic	0	7	9	
Health Professions and Related Programs				
Total	4,119	5,455	6,889	67%
Male	1,555	1,451	1,168	-25%
Female	5,334	4,004	2,951	-45%
White	643	4,085	4,117	540%
African American/Black	101	366	601	495%
Hispanic	66	150	204	209%
TOTAL	**22,579**	**28,756**	**29,276**	**30%**

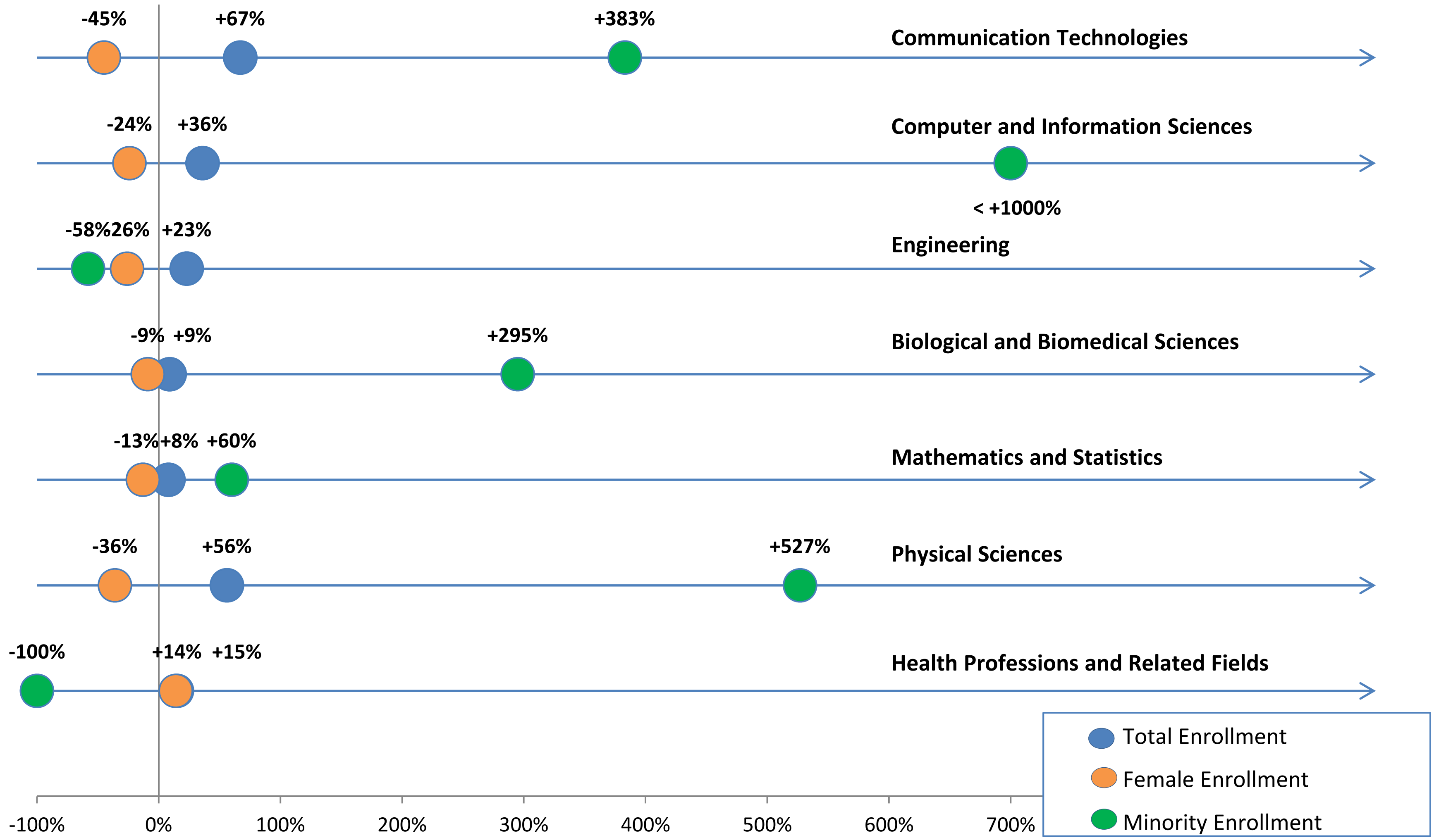


Figure 39. Percentage change in number of degrees in STEM-related career clusters at 4-year colleges and universities, 2010-2012

Table 27. Four-year institutions' fall enrollment by career cluster (all students)

	2004	2006	2008	2010	2012	% Change 2004-2012
Engineering						
Total	7,301	7,076	7,724	9,017	10,269	+ 41%
Male	6,081	5,902	6,446	7,475	8,517	+ 44%
Female	1,283	1,174	1,278	1,542	1,752	+ 49%
White	5,356	5,280	14	6,496	7,260	+ 36%
African American/Black	167	165	0	213	221	+ 32%
Hispanic	151	167	167	236	357	+ 136%
Biological Sciences/Life Sciences						
Total	5,316	5,829	6,204	6,677	6,900	+ 30%
Male	2,297	2,491	2,766	2,997	3,026	+ 32%
Female	3,019	3,338	3,438	3,680	3,874	+ 28%
White	4,143	4,484	484	5,014	5,083	+ 23%
African American/Black	147	177	22	256	263	+ 79%
Hispanic	127	146	170	257	339	+ 167%
Mathematics						
Total	1,438	1,225	1,435	1,473	1,787	+ 24%
Male	942	722	831	870	1,047	+ 11%
Female	496	503	604	603	740	+ 49%
White	831	847	150	998	1,167	+ 40%
African American/Black	24	48	2	34	42	+ 75%
Hispanic	23	33	26	44	68	+ 196%
Physical Sciences						
Total	1,581	1,671	1,753	2,026	2,016	+27.5%
Male	1,015	1,105	1,139	1,324	1,316	+29.7%
Female	566	566	614	702	700	+23.7%
White	1,077	1,127	163	1,459	1,396	29.6%
African American/Black	31	39	1	39	30	-3.2%
Hispanic	26	40	25	53	79	+203.8%
Medicine (MD)						
Total	633	627	629	644	644	+1.7%
Male	345	323	324	343	366	+6.1%
Female	288	304	305	301	278	-3.5%
White	476	462	0	482	455	-4.4%
African American/Black	22	21	0	26	19	-13.6%
Hispanic	40	43	36	29	44	+10.0%
TOTAL	**16,269**	**16,428**	**17,745**	**19,837**	**21,616**	+32.9%

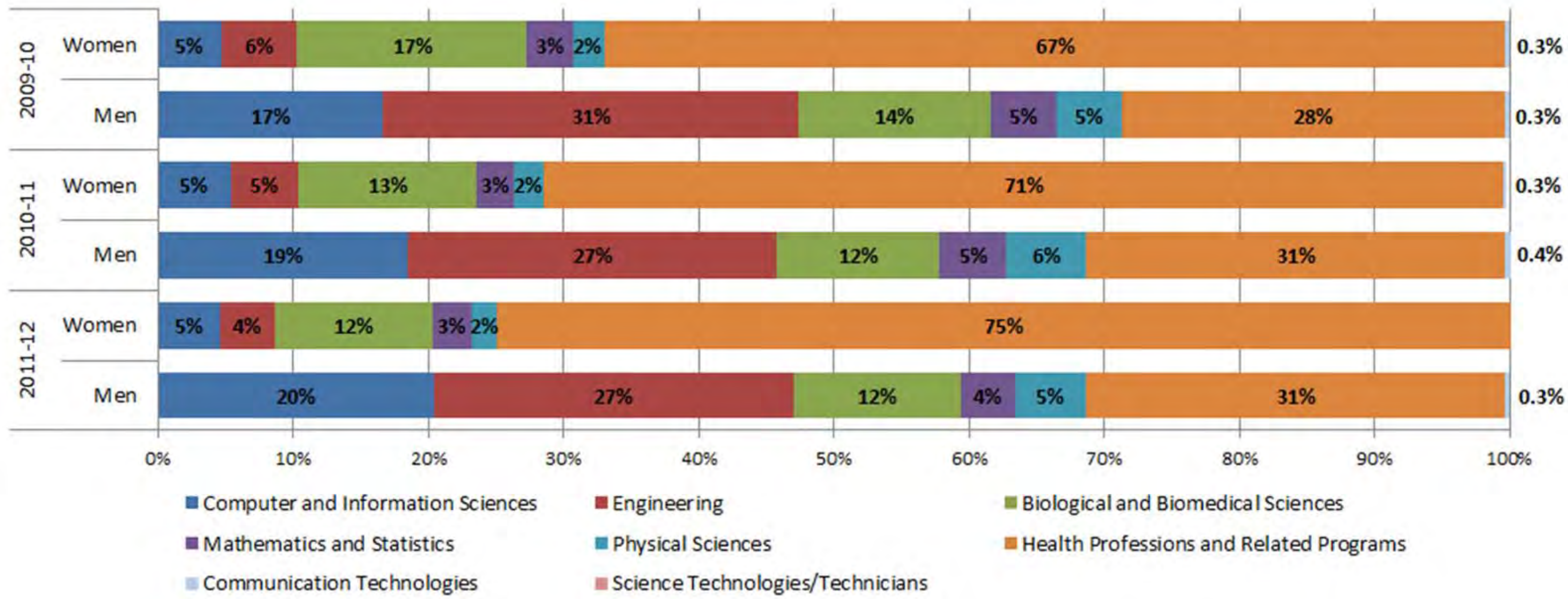


Figure 40. Percentage of total aggregated degrees conferred by STEM field and gender

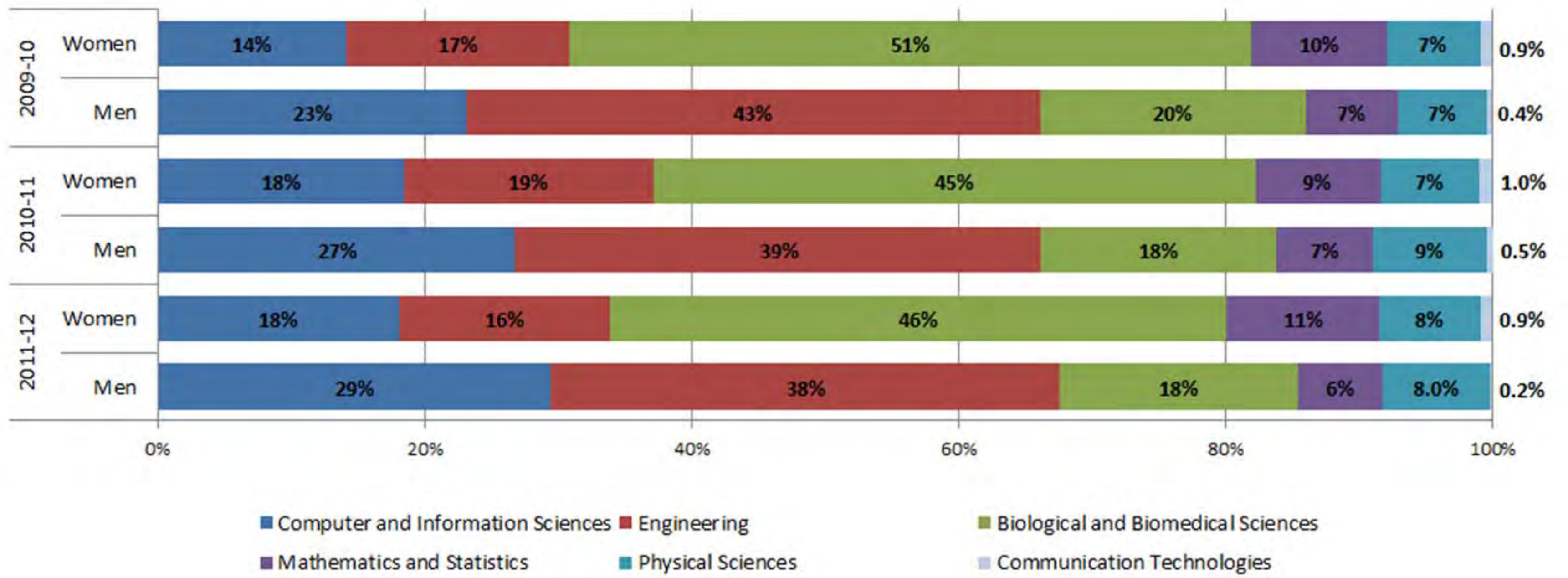


Figure 41. Percentage of total aggregated degrees conferred by STEM field and gender excluding health professions

Indicator 16: Percentage of Iowans in workforce employed in STEM occupations

Data source Iowa Workforce Development

Key findings

Projected growth rates in employment are calculated for a variety of occupational areas over ten-year periods.

- Approximately 16% of Iowa's occupations are in STEM fields (Table 28).
- From 2010 to 2020, Iowa's STEM occupations are expected to grow 2% annually, compared to a 1.3% annual growth rate across all occupations (Table 29).
- On average in 2012, individuals in STEM occupations earned $28.28 in mean wages and $58,800 in mean salaries, compared to all occupations overall earning $18.90 in mean wages and $39,300 in mean salaries, respectively.
- By gender, a larger proportion of females than males are employed in the STEM-related fields of life/physical/social science and healthcare occupations (Table 30).
- The greatest disparities in distribution of males versus females are in the fields of construction, production and transportation, and architecture and engineering occupations.

Table 28. Percentage of Iowans in workforce employed in STEM occupations

Time period	Total STEM employment	Total employment (all occupations)	%STEM of all occupations
2008-2018	358,960	1,762,260	20%
2010-2020	267,765	1,717,020	16%

Table 29. Iowa estimated employment in STEM fields: Projections, growth, and salaries

Occupations	2010 Estimated employment	2020 Projected employment	Annual growth rate	2012 Mean Wage($)	2012 Mean Salary($)
Computer & Mathematical	25,405	32,045	2.6%	34.28	71,292
Architecture & Engineering	13,955	16,140	1.6%	28.76	59,824
Life, Physical, & Social Science	7,120	8,065	1.3%	25.76	53,582
Business, Financial, and Management	43,775	52,625	2.0%	37.90	78,838
Healthcare Practitioners, Technical, and Support	110,075	133,325	2.1%	28.65	59,591
Construction, Installation, Maintenance, & Repair	35,810	42,565	1.9%	20.56	42,761
Production and Transportation	19,260	22,520	1.7%	21.40	44,504
Other STEM Occupations*	12,365	13,585	1.0%	28.90	60,115
Total STEM Occupations	**267,765**	**320,870**	**2.0%**	**28.28**	**58,813**
Total All Occupations	**1,717,020**	**1,948,700**	**1.3%**	**18.90**	**39,295**

Source: Communications and Labor Market Information Division, Iowa Workforce Development

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

*Other includes graphic designers, postsecondary business/biological science/nursing teachers, animal breeders, technical & scientific product sales & manufacturing, and fire fighters.

Table 30. Distribution of males and females in STEM occupations, 2013

STEM Occupational Category	% Male	% Female
Computer & Mathematical Occupations	53%	47%
Architecture & Engineering Occupations	89%	11%
Life, Physical, & Social Science Occupations	44%	56%
Business, Financial, and Management Occupations	46%	54%
Healthcare Practitioners, Technical, and Support Occupations	8%	92%
Construction, Installation, Maintenance, & Repair Occupations	95%	5%
Production and Transportation Occupations	94%	6%
Other STEM Occupations	48%	52%
TOTAL	**36%**	**64%**

Source: 2013 Iowa Workforce Development Statewide Laborshed Survey, Communications and Labor Market Information Division, Iowa Workforce Development

Note: Laborshed occupations were matched by job title to the STEM occupations used in Table 28.

Indicator 17: Job vacancy rates in STEM occupational areas

Data source Iowa Workforce Assessment Survey, Iowa Workforce Development

The Workforce Needs Assessment Survey is conducted each year with employers in the state by Iowa Workforce Development to assess the demand and skills required for jobs in several sectors of the workforce. The Workforce Needs Assessment was last updated in 2012; with new projections expected late fall 2014.

Key findings

- From 2011-2012, there were an estimated 10,000 vacancies in STEM jobs statewide. (Table 31).

Table 31. Estimated job vacancy rates in STEM occupational areas

Occupational Category	Vacancy Rate 08/09	Est. Vacancy 08/09	Vacancy Rate 09/10	Est. Vacancy 09/10	Vacancy Rate 11/12	Est. Vacancy 11/12
Architecture and Engineering	07%	1,238	03%	616	05%	815
Community and Social Science	05%	1,165	03%	651	03%	699
Computer and Mathematical science	04%	1,238	01%	392	03%	810
Farming, Fishing, and Forestry	06%	362	04%	491	11%	588
Healthcare Practitioner and Technical	06%	4,724	03%	2,578	04%	2,738
Healthcare Support	08%	3,669	04%	1,961	08%	3,953
Life, Physical, and Social Science	05%	605	06%	905	06%	659
Total Estimated Vacancies		**13,001**		**7,594**		**10,262**

Note. Occupational Categories not included in this table are: Arts, Design, Entertainment, Sports, & Related; Building & Grounds Cleaning & Maintenance; Business & Financial Ops; Construction & Extraction; Education, Training, & Library; Food Preparation & Serving Related; Installation, Maintenance, & Repair; Legal; Management; Office & Administrative Support; Personal Care & Service; Production; Protective Service; Sales & Related; and Transportation & Material Moving.

Indicator 18: STEM workforce readiness

Data source ACT, Inc.; Iowa Workforce Development

Key findings

- The number of individuals taking the National Career Readiness Certificate (NCRC) has increased from approximately 6,000 in 2012 to over 20,000 in 2013. (Table 32).
- The percent of individuals deemed workforce-ready based on the results of the NCRC assessment has remained relatively constant during that time (approximately two-thirds of test-takers each year).

Table 32. Percentage of Iowa test takers who are workforce ready in applied mathematics on the National Career Readiness Certificate

		2010	2011	2012	2013	% Change 2010-2013
Test-takers						
	Overall	3,645	4,808	6,344	20,589	+465%
Scored 5+						
	Overall	2,404	3,300	4,281	13,672	+469%
% Workforce-ready						
	Overall	66%	69%	67%	66%	0%

Note. 2010-2012 counts updated from Year 1 report based on data provided by Iowa Workforce Development, June 2014. STEM workforce readiness was estimated using results from the ACT National Career Readiness Certificate (NCRC). This assessment examines employability skills in three domains: applied mathematics, locating information, and reading for information. Here, the proportion of NCRC test takers receiving a 5 or better score on the Applied Mathematics component is used as a proxy for STEM workforce readiness. Subsequent years are linked to calculate a percentage on the basis that test takers from previous years are accumulating in the workforce.

Section 2. Statewide Survey of Public Attitudes Toward STEM

Data source Iowa Statewide Survey of Public Attitudes Toward STEM (UNI Center for Social and Behavioral Research, 2013)

Methods To measure public awareness, the UNI CSBR conducts an annual statewide public survey of Iowans. The survey was developed in 2012 (a description of the process can be found in the 2013 annual report) and revised slightly for the 2013 administration (see Appendix F for the survey instrument used in 2013).

The 2013 survey used a dual-frame (land and cellphone) random digit (DF-RDD) and targeted sampling methodology. A total of 1,872 interviews (610 landline, 652 cellphone, 407 targeted parents, and 204 targeted Hispanic adults) were completed from June 19, 2013 through September 14, 2013, and averaged 25 minutes in length. The overall response rate (AAPOR RR3) was 30% with RR cellphone (37%) higher than RR landlines (31%), targeted parents (23%) and Hispanics adults (25%). The overall cooperation rate (AAPOR CR3) was 70% with CR for cellphone (79%) higher than the CR for landlines (65%), targeted parents (70%) and Hispanics adults (61%). Participants were Iowans who were at least 18 years of age or older at the time of the interview.

Analysis The data has been weighted in order to obtain point estimates that are representative of all adult Iowans (age, gender, education, etc.). The post-stratification weights were computed with SAS (see www.rti.org.sas) and the process can be found in Appendix G. Descriptive statistics, including frequencies and distributions were calculated for the total sample and for population subgroups based on gender, education, parent status, and for place of residence for select questions in the survey (See Appendix H for item frequencies for each survey item). The SPSS software (see www.ibm.com/software/analytics/spss/) was used for initial data management and descriptive analysis, and SUDAAN software (see www.rti.org/sudaan) was used to estimate population estimates of attitudes toward STEM. These analyses in SUDAAN have been adjusted for the design effect[1] due to clustering and weighting. SUDAAN was also used for logistic regression to model some of the main findings of this study. Further explanation of this multivariate analysis (RLOGIST command in SUDAAN) can be found at www.rti.org/sudaan. The significance level was set at a p-value of 0.05 (or 5%) for all analyses. Unless otherwise noted, the term "percent" refers to the "weighted percent" and **not** the percent of survey respondents.

[1] The Design Effect (**DEFF**) is a measure of estimated ratio between variances between cluster vs. simple random sampling design in a weighted data analysis. See more information at www.rti.org/sudaan.

2013 Survey Results

A total of 1,872 completed interview were conducted (Table 32).

Table 33. Demographic characteristics of statewide survey

Demographic Characteristic	Sample size (n)	Population Estimate	2013 % (weighted)
Total Sample	**1,872**	**2,311,029**	**--**
Gender			
Men	764	1,132,723	49%
Women	1,108	1,178,306	51%
Age Group			
18-44	640	1,019,767	45%
45-64	726	807,314	35%
65 and older	483	451,603	20%
Race/Ethnicity			
White	1,646	2,051,713	91%
Hispanic/Latino (All races)	116	101,547	4%
Black / African American	79	59,602	3%
Other	17	35,659	2%
Education			
High school graduate/GED or less	569	881,764	38%
Some college or technical school (1-3 yrs, AA)	551	753,941	33%
4-year undergraduate or graduate degree	748	669,293	29%
STEM degree or training			
Yes	602	638,790	28%
No	1,264	1,667,604	72%
Current or recent employment that uses STEM skills			
Yes	920	1,074,393	54%
No	716	924,908	46%
Income			
Less than $25,000	245	318,898	17%
$25,000 to $49,999	391	501,309	26%
$50,000 to $74,999	306	411,603	21%
$75,000 to $99,999	259	292,309	15%
$100,000 or More	462	398,430	21%
Place of residence			
Rural / Small town (<5,000 pop.)	860	948,540	42%
Large town (5,000-<25,000 pop.)	317	647,748	28%
Urban (>25,000 pop.)	667	673,130	30%
Parent			
Not a parent of a school aged child	1,082	1,655,015	72%
Parent of 4-11 year old	334	275,544	12%
Parent of 12-19 year old	456	380,470	16%

Note. Respondents who said “don’t know” or who did not give a response to the demographic questions are excluded from the distributions above.

STEM awareness and exposure

In 2013, a majority of Iowans (78%) had heard something in the past month about K-12 education and 61% had heard something about improving math, science, technology, and engineering education (Figure 42). In 2013, 41% of Iowans had heard of the acronym STEM, and 33% of Iowans had heard about the Iowa Governor's STEM Advisory Council.

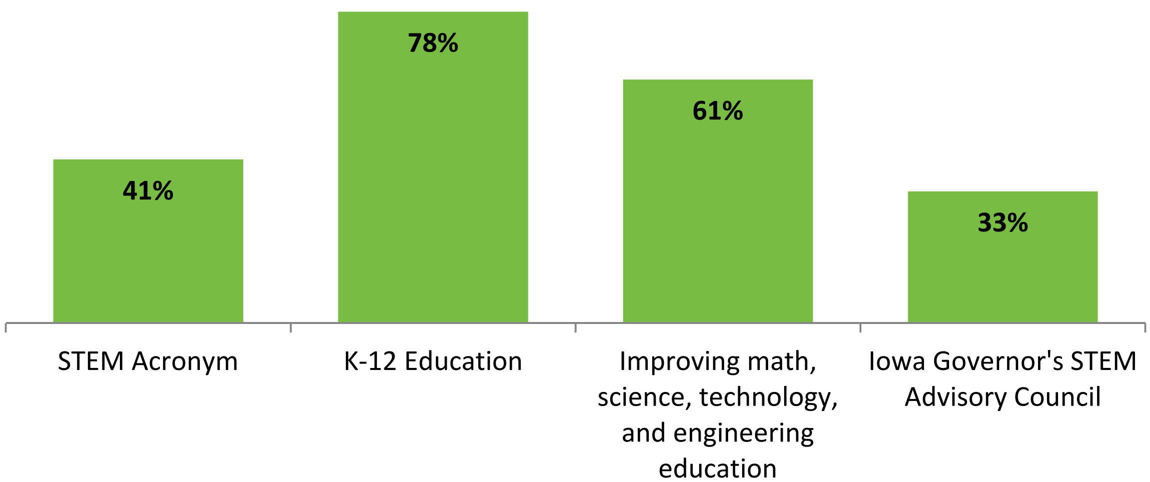
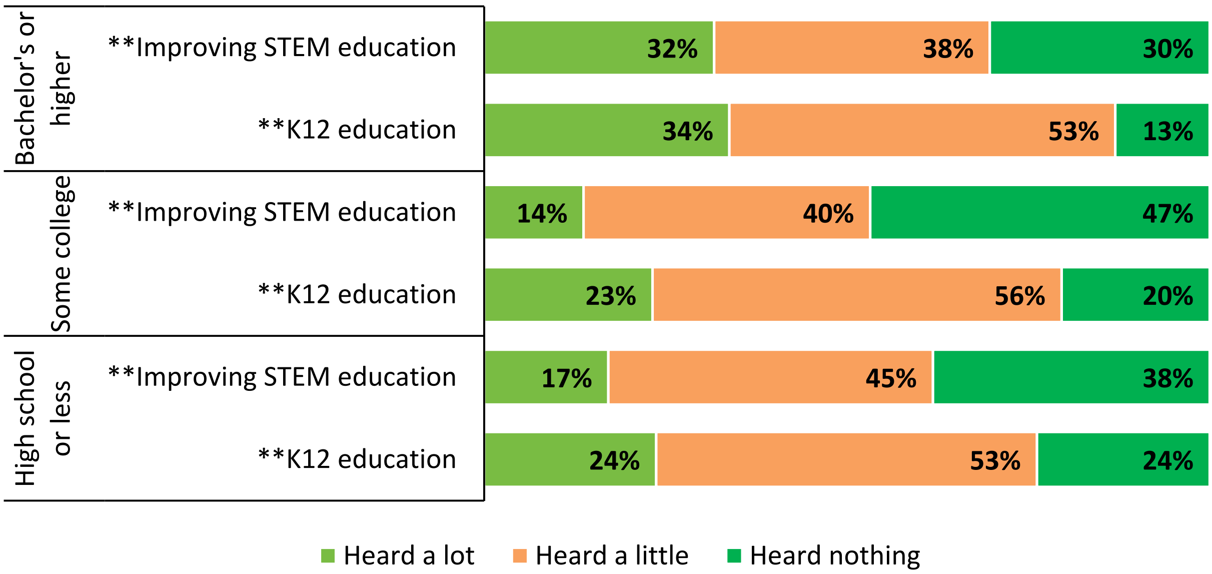


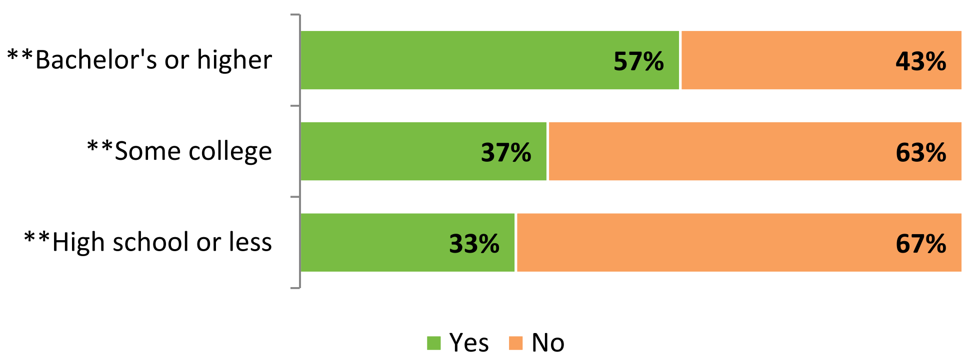
Figure 42. Percentage of Iowans with awareness of STEM

Iowans with higher educational attainment (BA or higher) were most likely to have heard about K-12 education, improving STEM education, and the acronym STEM (Figure 43 and Figure 44). In multi-variable logistic regression analysis, having a 4-year degree or more was the only significant factor associated with awareness of STEM, while controlling for gender, race/ethnicity, income level, urban/rural location, or parent status (p=0.002).



**p<.01

Figure 43. Percentage of adult Iowans who have heard about K-12 education or improving STEM education in the past month by educational attainment



**p<.01

Figure 44. Percentage of adult Iowans who have heard about the acronym STEM by educational attainment

Schools, libraries, zoos, and museums are all educational settings where exposure to STEM topics, STEM education, and STEM-related activities may occur. Over two-thirds of Iowans reported having visited a public library in the past year, and over one-half had visited a K-12 school (Figure 45).

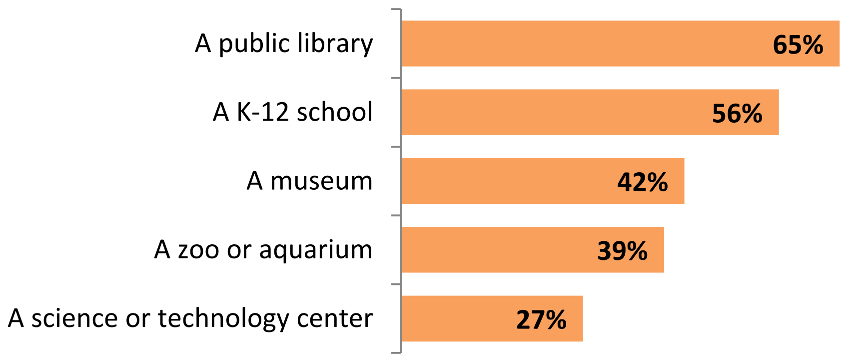


Figure 45. Percentage of Iowans who have visited educational settings where STEM learning may occur

Attitudes toward STEM and the role of STEM in Iowa

Public attitudes toward STEM topics are generally positive which may indicate some of the foundational public awareness already exists. The majority of Iowans agree that STEM fields provide more opportunities for the next generation (98%), and that science and technology are making our lives better (97%) (Figure 46). In addition, 89% of Iowans agree that focus on STEM education will improve the state's economy. Nearly three-quarters (72%) of Iowans said there were *not enough* workers to fill STEM jobs (Figure 47), and that more should be done to increase participation in STEM jobs among women and underrepresented minorities.

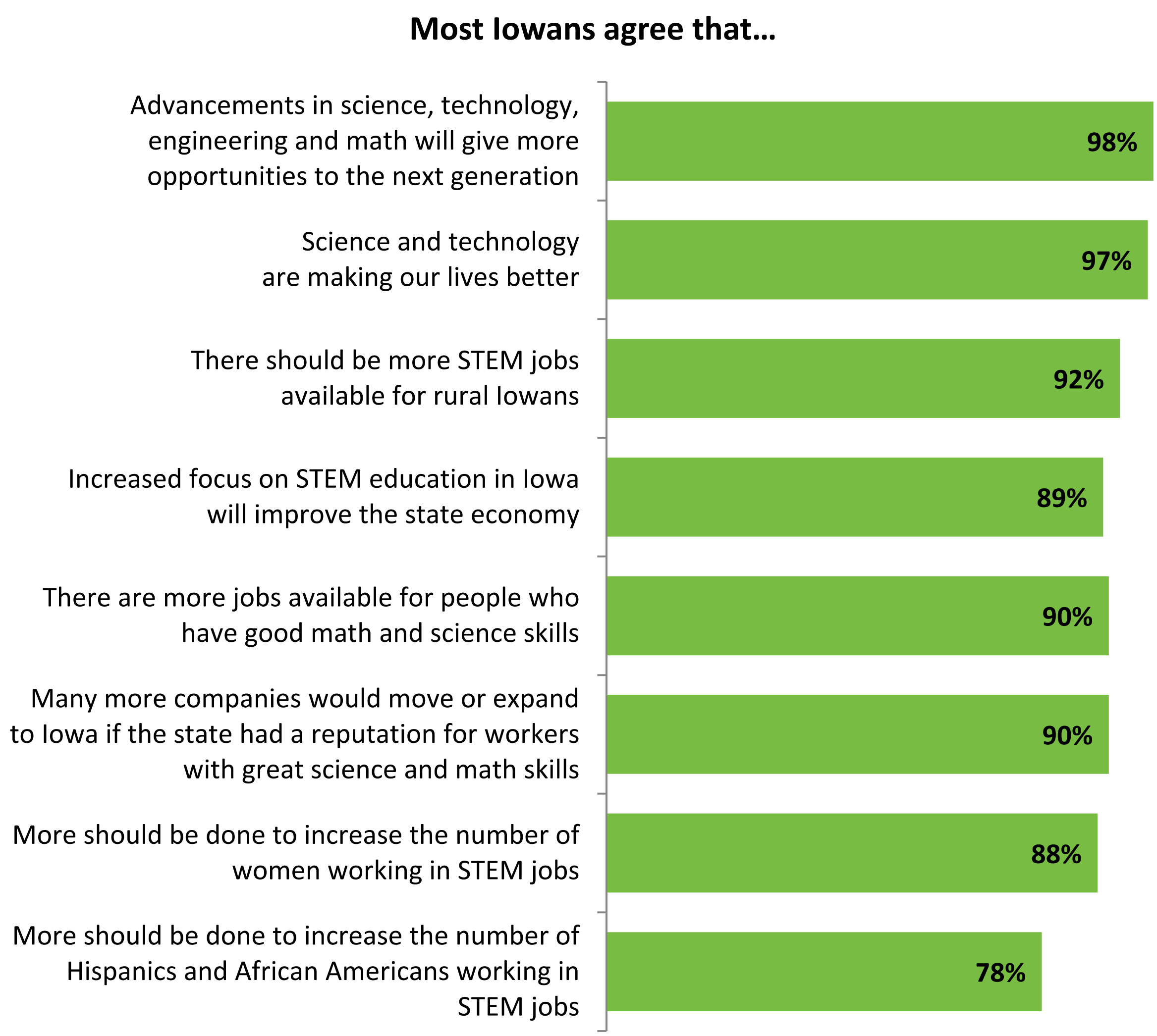


Figure 46. Attitudes toward STEM, the economy, and workforce development (% Agree)

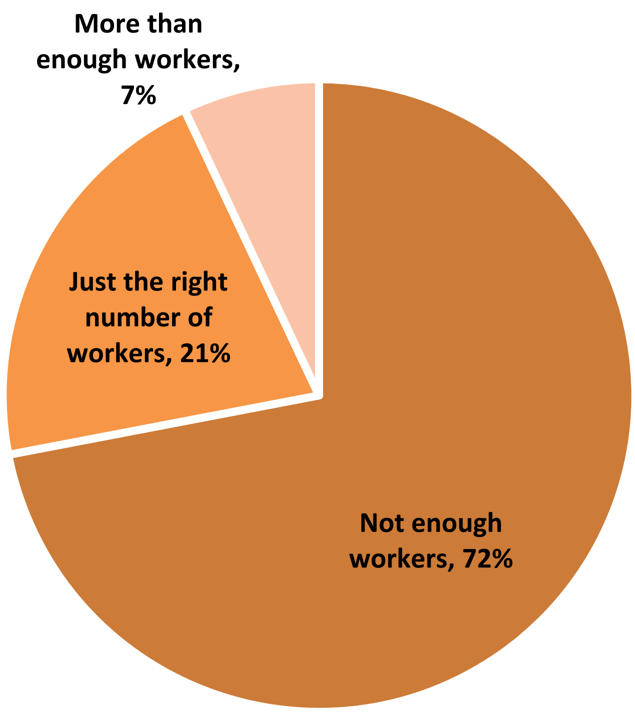


Figure 47. Percentage of Iowans who feel there are enough skilled workers to fill available STEM jobs

STEM education

Nearly all of Iowans surveyed (95%) agree that math and science teach important critical thinking skills (Figure 48). The majority also agree that Iowa colleges and universities are doing a good job preparing students for STEM careers (80%) and STEM teachers (73%). Over 60% of Iowans say that the quality of science and math education is *excellent* or *good.* However, just half (53%) say technology education is *excellent* or *good*, and only one-third (36%) say engineering education is *excellent* or *good* (Figure 49). Among possible reasons why some students may do poorly in math and science, 86% of Iowans said students think the subjects aren't relevant to their lives, 80% said students think the subjects are too hard, and 58% said there are not enough good science and math teachers.

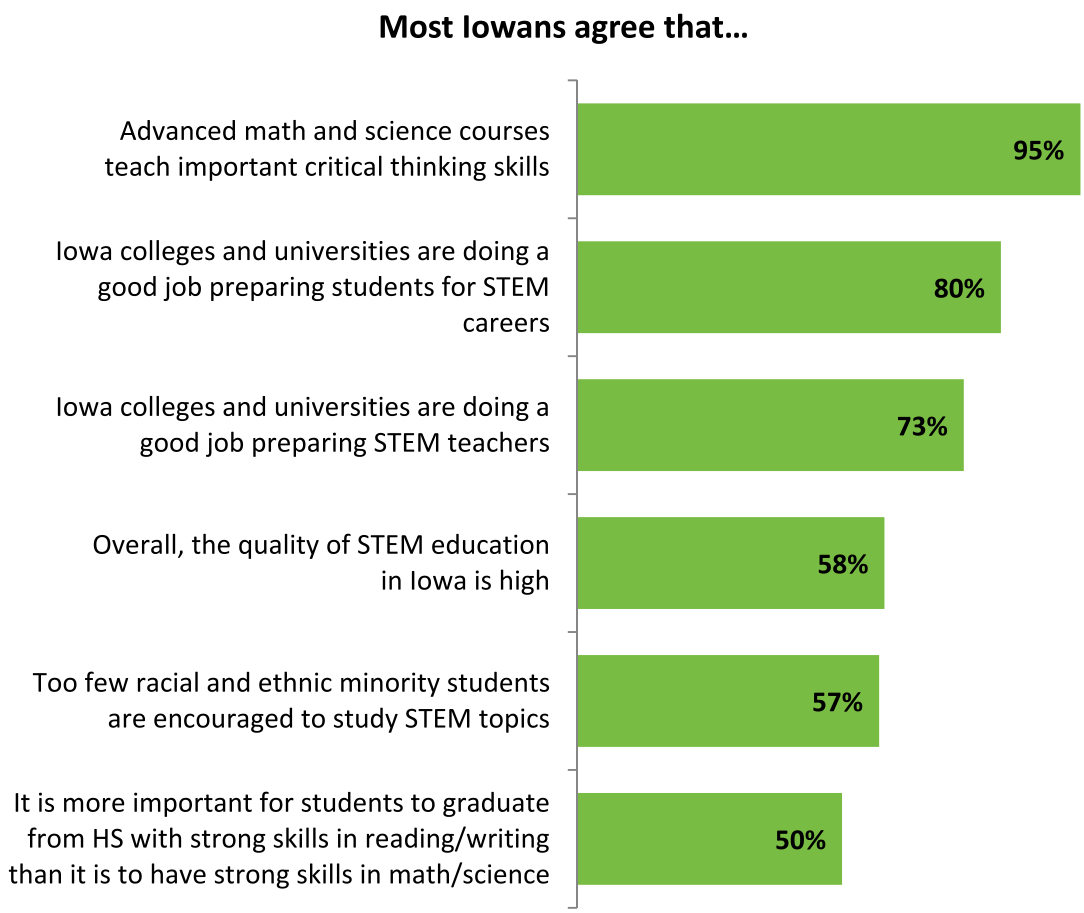


Figure 48. Attitudes about STEM education (% Agree)

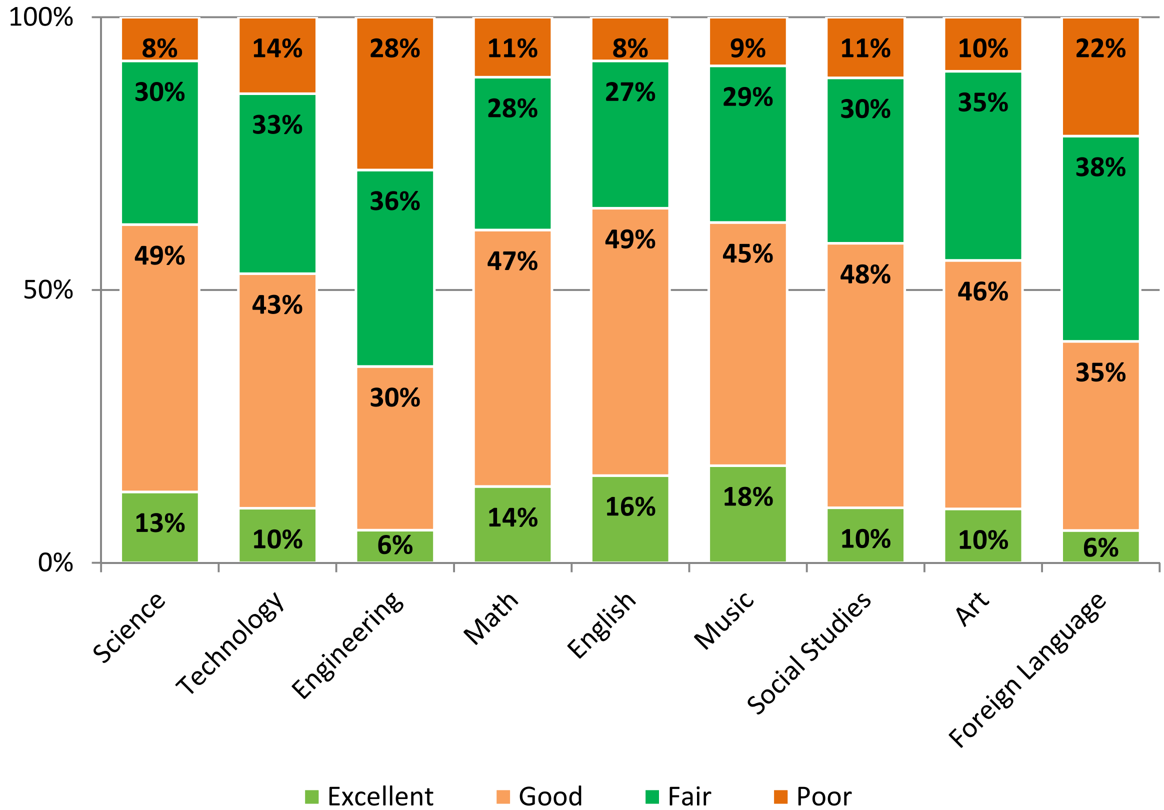


Figure 49. Quality of education in schools

Perceptions about strategies to improve STEM education

In 2013, 86% of Iowans agreed there is an urgent need in Iowa for more resources to be put toward STEM. Over half of Iowans believe hands on experiences (in elementary classrooms, with businesses, or in a lab) would make a "major improvement" in math and science education. Ensuring access to a full range of math and science courses, and providing internships for developing practical job skills were the also commonly cited strategies to improve math and science education among respondents (Figure 50).

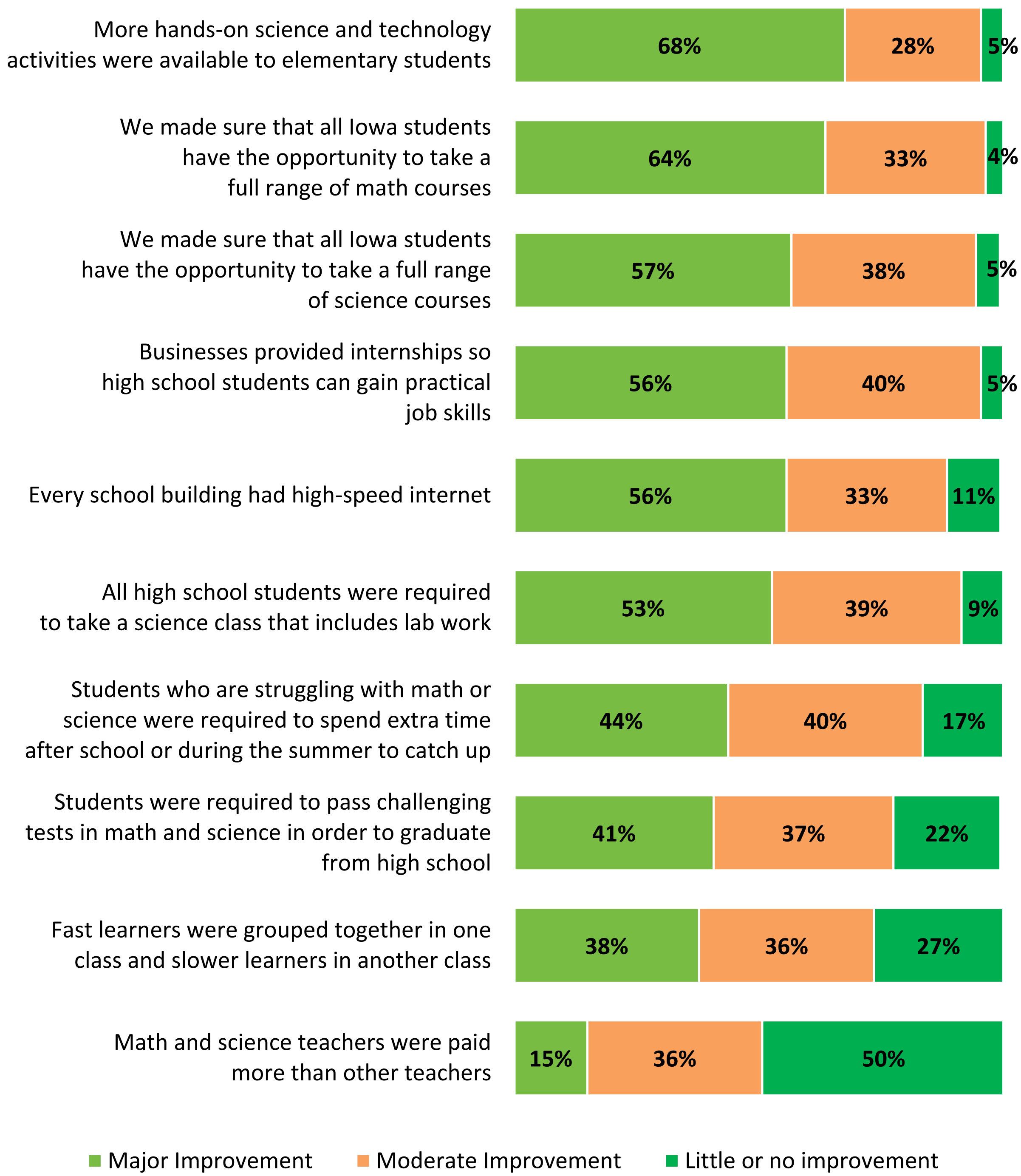


Figure 50. Strategies to improve math and science education in Iowa

Parent perceptions of STEM education

In addition to the topics listed above, parents of pre-kindergarten through 12th grade students received questions about the following topics: attitudes toward Iowa K-12 Schools (e.g. time spent on STEM topics, quality of instruction in STEM topics), importance of STEM skills, their child's educational progress/goals (e.g. plans after graduation, perceived child interest/achievement in STEM topics and STEM careers), and STEM exposure in out-of school settings.

Importance Nearly all parents said that student exposure to and achievement in STEM topics is *very* or *somewhat important* to them (Table 34).

Table 34. Importance of STEM skills among parents with a school-aged child

Parents of 4-11 year olds: How important is it that your child…	% Very	% Somewhat	Parents of 12-19 year olds: How important is it that your child…	% Very	% Somewhat
Does well in math	91%	8%	Has some advanced math skills	64%	29%
Does well in science	81%	17	Has some advanced science skills	53%	37%
Has some technology skills	88%	10%	Has some advanced technology skills	63%	30
Has some exposure to engineering concepts	63%	33%	Has some exposure to advanced engineering concepts	30%	54

Response options: Very important, somewhat important, not very important

Interest and achievement

Among parents with a child 4-11 years old,

- 46% say their child shows *a lot* of interest in science, technology, engineering, and math topics
- 62% say their child doing *very well* in these subjects,
- 47% say their child is being *very well prepared* in these subjects by the school he or she attends.

Among parents with a child 12-19 years old,

- 48% say their child shows *a lot* of interest in science, technology, engineering, and math topics
- 56% say their child doing *very well* in these subjects,
- 47% say their child is being *very well prepared* in these subjects by the school he or she attends.

Exposure to STEM Nearly 62% of parents of a child 4-11 years reported they or their child has used technology to help complete homework or a school assignment, compared to 96% of parents of older children. In addition, 29% of parents of older children said their child has a school-issued iPad, table, or laptop compared to 9% of parents of younger children.

Parents also report some exposure for their child to STEM in out-of-school settings. Among parents of a child 4-11 years old, approximately 20% report participation in boy or girl scouts or a day program or summer camp related to STEM (Figure 51). Lower proportions of parents of a child 12-19 years old report their child's participation in STEM in any informal settings.

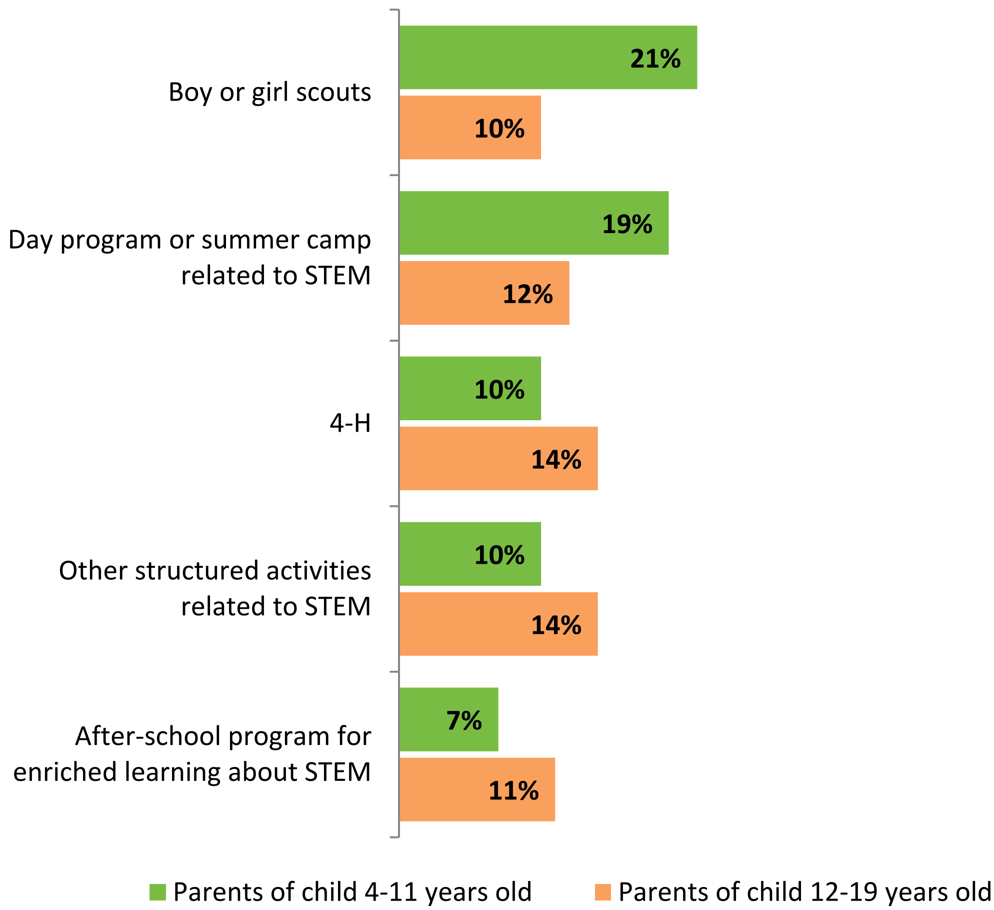


Figure 51. Participation in STEM-related activities in out-of school settings

Educational aspirations Parents of a child 12-19 years old were asked about their child's educational aspirations following high school, and whether they think their child will pursue a career in a STEM field. Over half (54%) said their child is likely to attend a 4-year college or university, and 27% said attend a 2-year community college. Sixty-one percent of parents of an older child said their child will pursue a career in a STEM-related field.

Changes from 2012 to 2013

Increased awareness and support for STEM

The 2013 Survey of Adult Iowans showed increased awareness of STEM and increases in support for STEM compared to the 2012 survey. In 2013, 41% of Iowans had heard of the acronym STEM. In contrast, only 26% of Iowans had heard of the acronym in 2012 (Figure 52). **This represents a 58% increase in awareness of the acronym STEM in one year.**

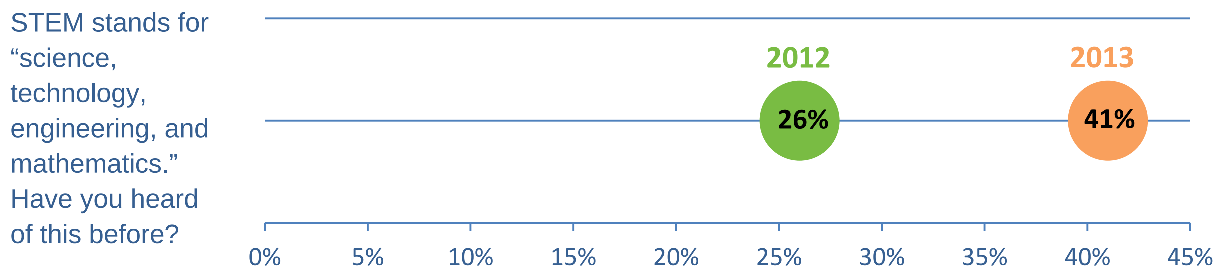
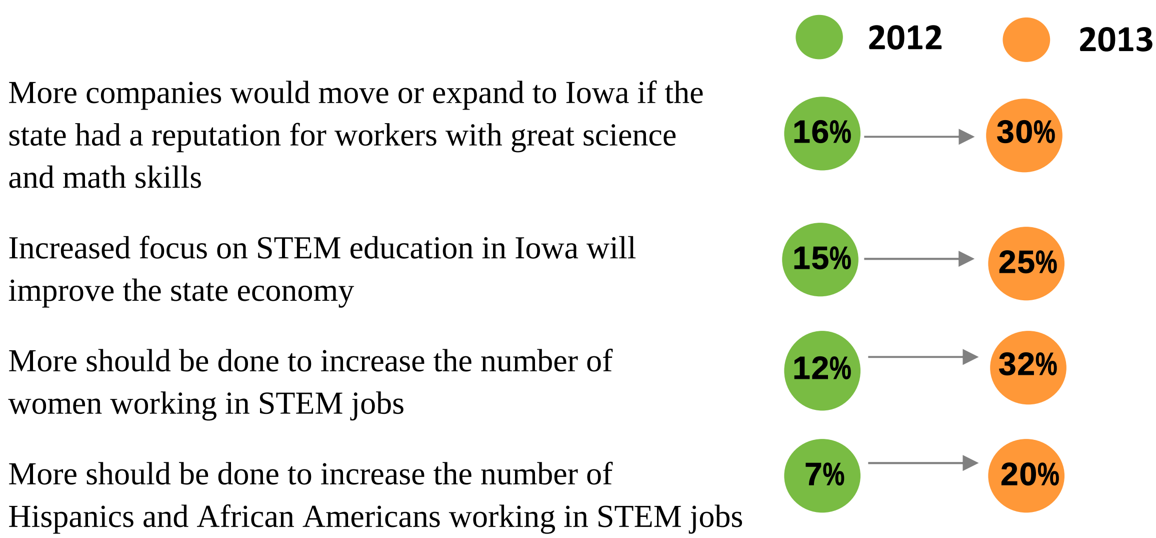


Figure 52. Increase in STEM awareness, 2012 to 2013

Awareness and attitudes toward STEM increased significantly between 2012 and 2013, especially in the areas of economic contributions and broadening STEM participation (Figure 53). From 2012 to 2013, significantly* more Iowans *strongly agree* that…



**All difference reported here statistically significant at p<0.001.*

Figure 53. Increases in attitudes toward STEM, 2012 to 2013

Increased perceptions of value for STEM investments

More Iowans see the value that STEM brings to their lives and in the opportunities and jobs available for the next generation. From 2012 to 2013, significantly more Iowans *strongly agree* that…

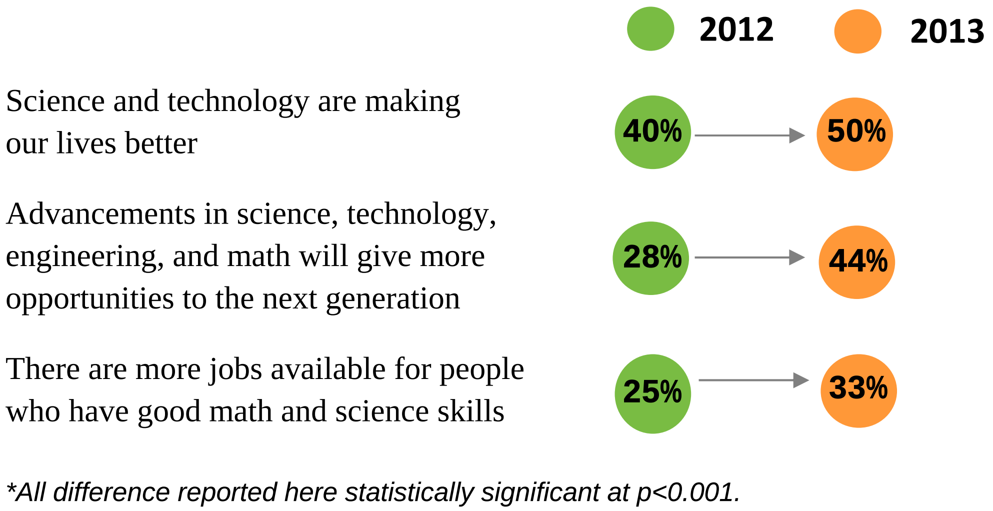


Figure 54. Increases in perceptions of value for STEM investments

Change in perceptions about STEM education

There were some decreases in public assessment of STEM in 2013 compared to the survey in 2012. Overall, most adults agree schools do well in teaching STEM topics; however, awareness may lead some to more keenly assess the quality of STEM edcation.

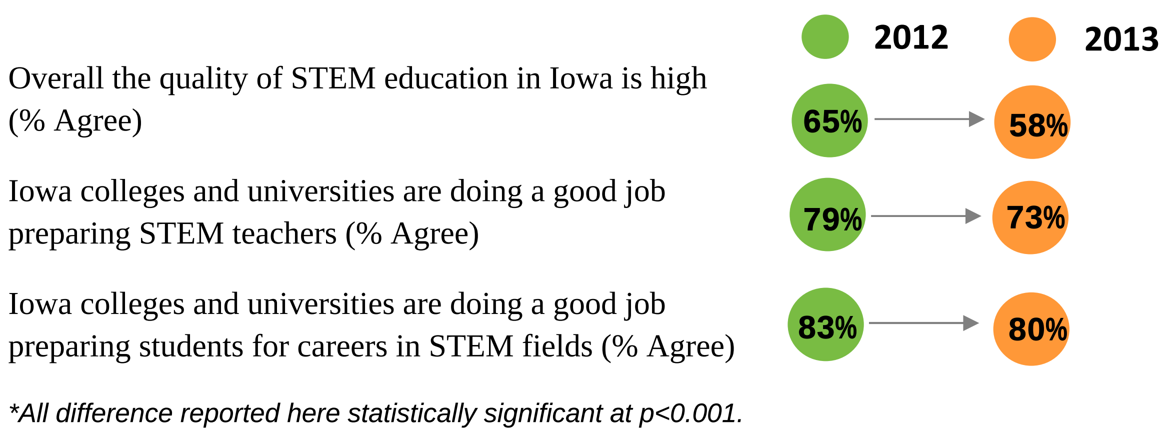


Figure 55. Change in perceptions about STEM education

Section 3. Statewide Student Interest Inventory

Data source Iowa Assessments, Iowa Testing Programs, The University of Iowa

Methods Iowa Assessments are standardized tests taken annually by nearly every student in grades 3 through 11 in the state. For the past two years, an 8-item interest inventory was added to the Iowa Assessments. Schools have the option to administer the inventory with their students. The Interest Inventory was developed in part to serve as a data source for both the Iowa STEM Indicators System (See Indicator 8 for a 2012-2013 versus 2013-2014 comparison), and a way to compare students who participate in Scale-Up Programs with all students statewide (See Section 4.2 Report of Participant Information).

Two versions of the inventory were created with variations in question wording and response options to accommodate different grade levels (Table 35). For 2013-2014, among the 346,774 students in Iowa who took the Iowa Assessments, 174,184 also completed the Interest Inventory (50.2% match rate). Item frequencies for each of the interest inventory questions can be found in Appendix I.

Table 35. Statewide Student Interest Inventory

Grades 3rd-5th	Grades 6th-12th
Response options: • I like it a lot • It's okay • I don't like it very much	Response options: • Very interested • Somewhat interested • Not very interested
1. How much do you like to create and build things?	1. How interested are you in designing, creating, and building machines and devices (also called engineering)?
2. How much do you like math?	2. How interested are you in math?
3. How much do you like science?	3. How interested are you in science?
4. How much do you like art?	4. How interested are you in art?
5. How much do you like reading?	5. How interested are you in English and language arts?
6. How much do you like using computers and technology?	6. How interested are you in computers and technology?
7. How much do you like social studies?	7. How interested are you in social studies (such as history, American studies, or government)?
8. When you grow up, how much would you like to have a job where you use science, computers, or math?	8. As an adult, how interested would you be in having a job that uses skills in science, technology, math, or engineering?

Key findings

- Among all students statewide who took the Iowa Assessments, interest in individual STEM subjects is highest among elementary students, followed by middle school and high school students, respectively (Figure 56).
- While interest in all subjects decreases as students' progress through school, the proportion of students who are "very interested" in pursuing a STEM career remains steady at 38-43%.
- Across all grade groups, the greatest proportion of students "very interested" in a STEM topic area is in the subject of technology.

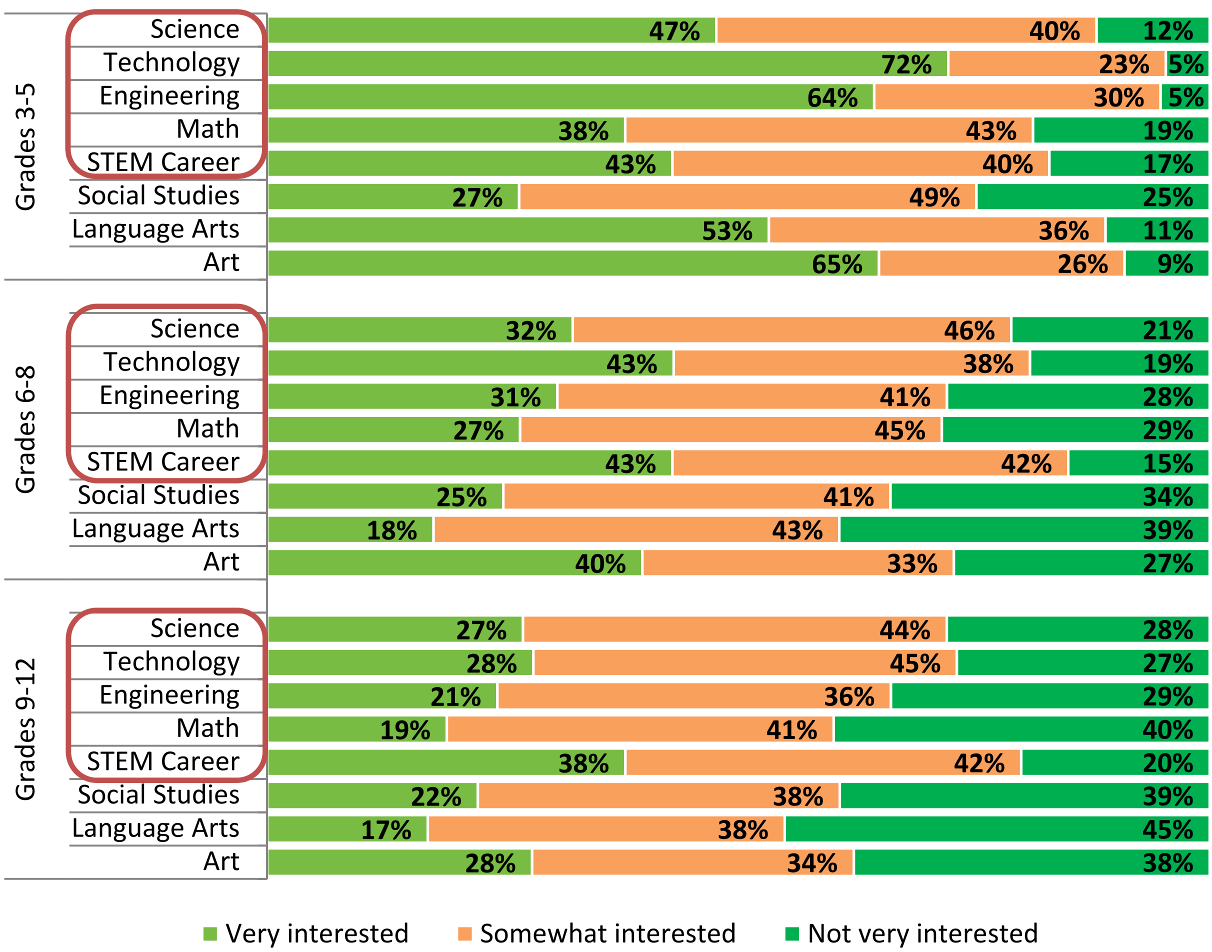
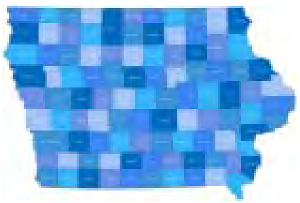


Figure 56. Statewide Student Interest Inventory for all students statewide by grade group, 2013-2014 (n=174,184)

Section 4.
Regional Scale-Up Program Monitoring



The Iowa STEM Regional Scale-Up Program was launched as a way to meet the Governor's STEM Advisory Council's top priority: to increase student interest and achievement in STEM across the state. In 2013-2014, nine Scale-Up programs were selected by an expert review panel which recommended and approved programs based on demonstrated success in increasing student interest and achievement in STEM, while offering the flexibility to be implemented in any size school or organization. The programs were administered through Iowa's six STEM Regional Hubs, and implemented through formal and informal local education agencies (LEA). An LEA is any school (public, private or home school association), a Boy/Girl Scout troop, a 4H Club, library, a childcare organization or any organization (e.g. Iowa State University Extension and Outreach, museums, science centers) that works with youth-formally or informally.

Methods As part of the Iowa STEM Monitoring Project, three submissions were expected from all LEAs implementing a Scale-Up Program: 1) a teacher/leader survey, 2) a student participant list, and 3) student surveys. Taken together, the three submissions inform the ISMP by providing the project partners with consistent information across all Scale-Up programs

The Teacher/Leader Survey is an online report that is submitted by each LEA implementing a Scale-Up program. The purpose of the Teacher/Leader Survey is to gather information about Scale-Up Program implementation and outcomes from teacher/leaders of all Scale-Up programs implemented in Iowa. All teacher/leaders implementing a Scale-Up program are asked to complete an online questionnaire via a web link. The data are submitted directly to RISE at ISU. (See Appendix J for Teacher/Leader Survey instrument)

In addition, any LEA implementing a Scale-Up program working directly with students in grades K-12 or working with teachers who have a class of K-12 students was asked to submit a student participant list to Iowa Testing Programs. The purpose of the student participant list was to provide information about each Scale-Up participant (or students impacted by a Scale-Up program) for Iowa Testing Programs to match Scale-Up participants to their records within the statewide dataset of students who have taken the Iowa Assessments. To protect the confidentiality of Scale-Up participants, the information used to match Scale-Up participants was submitted directly from the LEA to Iowa Testing Programs using a password-protected, secure web-based interface. The student participant lists are not shared with anybody from the STEM Advisory Council, STEM regional managers, or any ISMP staff. Iowa Testing Programs provided de-identified and aggregated interest and achievement scores of participants across programs to enable comparisons between Scale-Up participants and other students in the state.

Additionally, a short student questionnaire was created for completion by all students who participated in or were impacted by Scale-Up programs. These Scale-Up programs include those that either directly served K-12 students or served K-12 teachers with the goal of indirectly impacting student interest in STEM. The purpose of the student survey was to assess student interest in individual STEM topics and in pursuing a STEM career after participating in a Scale-Up Program.

The post-program student survey was coordinated by CSBR at UNI, and administered by teachers and program leaders using a seven-item questionnaire (Appendix O – Student Survey instruments). Teachers and program leaders were provided with an information letter to send home for parents, a script to read to students before administering the survey, and the student questionnaire. Three versions of the questionnaire were provided to accommodate different grade levels. Students were asked to report their age, gender, and any change in interest in individual STEM subjects and in pursuing a STEM career after participating in the program.

Interest was measured on a 3-point scale using variations of response options reflecting “more interested,” “just as interested,” or “less interested” (See Table 36). In addition, the lower elementary questionnaire included response options paired with smiley, neutral, or sad faces.

Analysis Data were analyzed using descriptive statistics. For the student survey only, T-tests or analyses of variance (ANOVAs) were used to test for statistically significant differences between male and female students, and across grade levels (elementary, middle, high school). Statistical significance is reported when $p<.05$ or less. Tests to determine statistically significant differences on the Interest Inventory or achievement on the Iowa Assessments between Scale-Up student participants and students statewide were not conducted due to the large difference in sample sizes (n=9,352 versus n=164,832, respectively).

Important considerations The post-test only design (no baseline survey of student participants was completed) limits the ability to see differences in student interest before and after Scale-Up program participation. In addition, results represent only those students or teacher/leaders who completed a questionnaire; nonresponse bias may impact the findings. Finally, response bias may impact the findings as students who are interested in STEM may be more likely to participate in some STEM programs.

Results Results from the 3 monitoring activities for Regional Scale-Up Programs are presented their respective sections that follow.

Table 36. Student survey interest measures

Lower Elementary	Upper Elementary	Middle/High School
Response options: I like it more now I like it the same now I like it less now	Response options: • I am more interested now • I am just as interested now • I am less interested now	Response options: • More interested now than before • Just as interested now as before • Less interested now than before
Think about how much you liked math in the fall. Do you like math more now, about the same, or less now?	Think about how interested you were in math in the fall. Are you more interested in math now, just as interested in math now, or less interested in math now?	Compared to the beginning of the (semester/program/etc.), are you more interested, just as interested, or less interested now in each of the following? • Math • Science • Computers and Technology
Think about how much you liked science in the fall. Do you like science more now, about the same, or less now?	Think about how interested you were in science in the fall. Are you more interested in science now, just as interested in science now, or less interested in science now?	
Think about how much you liked using computers in the fall. Do you like using computers more now, about the same, or less now?	Think about how interested you were in using computers in the fall. Are you more interested in using computers now, just as interested in using computers now, or less interested in using computers now?	
Do you like to design and build things more now, about the same, or less now than you did in the fall?	Think about how interested you were in designing, creating, and building things in the fall. Are you more interested in creating things now, just as interested in creating things now, or less interested in creating things now?	Compared to the beginning of the (semester/program/etc.), are you more interested, just as interested, or less interested in designing, creating, and building machines and devices (also called engineering)?
Are you more interested now, about the same, or less interested in having a job that uses science, math, and computer skills?	Are you more interested now, just as interested, or less interested in having a job that uses science, math, and computer skills?	Compared to the beginning of the (semester/program/etc.), are you more interested, just as interested, or less interested in someday having a job that uses skills in science, technology, math, or engineering?

Section 4.1 Teacher/Leader Survey

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

Key findings

The summary of findings of the Teacher/Leader Survey for 2013-2014 includes data collected across all six regional STEM Hub regions of the state and nine Scale-Up programs. See Appendix K for a description of the 2013-2014 Scale-Up programs. Data were collected for the following Scale-Up programs:

- A World in Motion (AWIM)
- Camp in a Can Show and Tell*
- Carolina STEM Curriculum*
- CASE—The Case for Agricultural STEM Education in Iowa
- Defined STEM*
- E=HC^2 Exploration = Health Careers Connection*
- Engineering is Elementary in Iowa (EiE)
- Hyperstream—Technology Hub for Iowa's Students
- Project Lead the Way: Gateway to Technology Program*

Note: * indicates new STEM Scale-Up program in 2013-14.

Eight hundred twenty-eight Iowa schools and organizations were awarded Scale-Up programs in 2013-14 (Table 37). (See Appendix L for a complete list. Note that the 828 entries include multiple entries from many school districts and buildings.)

Table 37. Number of schools or organizations participating in Scale-Up programs by STEM region

	LEAs	Number of LEAs by STEM Region					
Scale-Up Program	**n**	**NW**	**NC**	**NE**	**SW**	**SC**	**SC**
Total	**828**	**209**	**97**	**114**	**145**	**163**	**100**
A World in Motion	148	42	10	18	26	36	16
Camp in a Can	37	--	8	8	7	7	7
Carolina STEM Curriculum	248	63	21	42	56	32	34
CASE	62	6	10	12	13	11	10
Defined STEM	85	44	21	5	8	7	--
E=HC^2	4	--	4	--	--	--	--
Engineering is Elementary	138	33	9	7	21	51	17
Hyperstream	62	14	8	14	8	15	3
PLTW	44	7	6	8	6	4	13

Source: Summarized from http://www.iowastem.gov/2013-14-scale-programs (retrieved 7/4/2014)

A total of 591 surveys were completed and returned, for an overall response rate of approximately 71%. Forty percent of the respondents classified themselves as the Scale-Up contact (the contact person named in the application), 80% as school-based Scale-Up teachers, and 12% as out-of-school based Scale-Up leaders (respondents could check more than one category). Appendix M details the subjects taught by Teacher/Leader respondents. It is important to note that responding teachers reported teaching all subjects, not just STEM subjects. All grade levels (Pre-Kindergarten through 12th grade) were impacted by the Scale-Up programs as well.

Program Participation

Five-hundred ninety-one (591) Scale-Up programs were represented in the sample, documenting 31,677 participants in three different categories: 1) K-12 students; 2) parents; and 3) "others" (Table 38). Other participants included community members/partners, engineers, business mentors, college students, and other K-12 students from different grades. (See Appendix N for a listing of the other participants.)

All Scale-Up programs involved K-12 students (although 15 did not report numbers of student participation). Additionally, about one-fifth of the programs included parents and one-fourth included 'others.' About 54% of the student participants were male. Interestingly, in 2012-2013, about two-thirds of the student participants were male.

Table 38. Teacher/leader report of Scale-Up program participation

	Number of Programs Reporting	Percentage of Programs	Number of Participants	Percentage of Male Participants	Percentage of Female Participants
Students (K-12)	576	97.5%	30,589	53.8%	46.2%
Parents	103	17.4%	378	34.6%	65.4%
Others	148	24.9%	711	37.8%	62.2%

Program Implementation

Teacher/Leaders reported on six aspects of program implementation: 1) whether programs were implemented as intended or were modified; 2) experiences with service providers and challenges or barriers faced in working with service providers; 3) collaboration with local groups; 4) local involvement; 5) challenges in implementing the Scale-Up program; and 6) recommendations to others implementing a Scale-Up program. Summaries of open-ended responses follow. A full listing of open-ended comments related to Scale-Up program implementation is provided in Appendix O.

*Implementation***.** Over half of the respondents (57%) reported implementing their Scale-Up programs as intended. One third (36%) implemented the program with minor changes and 8%

implemented it with major changes. Reasons given for deviations to timelines and plans included setbacks due to time constraints, bad weather, late arrival of materials, other lessons that interfered with STEM programming, and lack of mentors. Additionally, many teacher/leaders customized their Scale-Up program in order to serve unique local needs. Some of the customizations included adjusting lessons to fit grade level (including vocabulary), adjusting or eliminating lessons due to time constraints, offering the program outside of the classroom in after-school or summer programs, and utilizing different materials than those provided in the kits. See Appendix O for a complete list of comments detailing Teacher/Leaders modifications of the implementation of Scale-Up programs.

Experiences with service providers Teacher/leaders reported to what extent they experienced the following with service providers: adequate contact, timeliness of receipt of materials and resources, responsiveness to questions and needs, and overall expectations of partnership (Figure 57). Over 80% of the teacher/leaders reported having positive experiences with their service providers all or most of the time. They reported that they had adequate contact with the service provider, they received materials and resources in a timely manner, the service provider was responsive to questions and needs, and the partnership met overall expectations.

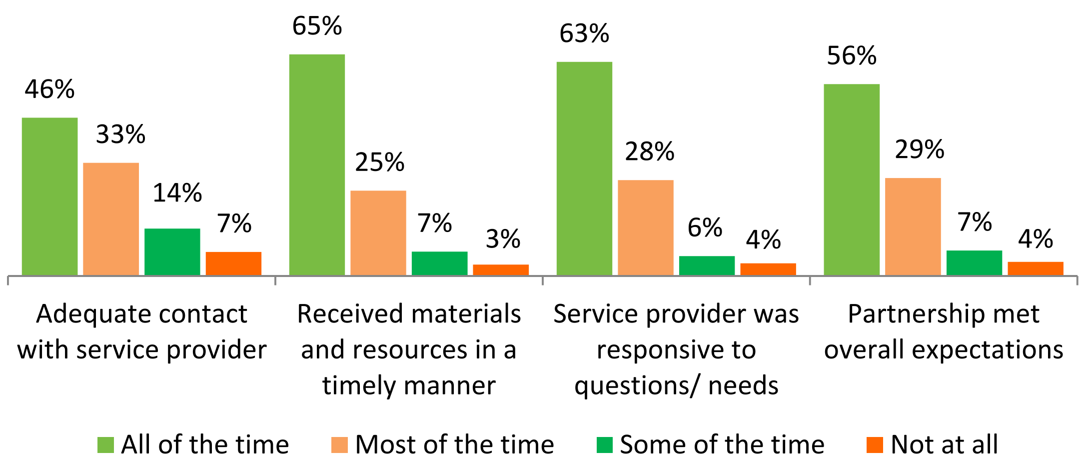


Figure 57. Teacher/Leader experiences with service providers

The percentage of teacher/leaders that responded “not at all” to any of the categories ranged from 3% to 7% and were related to receiving materials late or receiving incomplete materials, poor communication (i.e., unanswered emails, phone calls, voicemails), frustration, and inflexibility of grant funding rules. See Appendix O for a complete list of comments detailing teacher/leaders’ challenges and barriers faced when working with their service providers.

Collaboration Teacher/leaders also reported on collaboration between their specific Scale-Up program and various entities, including in-school groups, out-of-school groups, community groups, volunteer groups, and "other" groups (Table 39). About 58% reported collaborations with in-school groups, and over 20% of Scale-Up programs collaborated with out-of-school groups. Approximately 15% of Scale-Up programs collaborated with community or volunteer groups as well.

Table 39. Collaborations between Scale-Up programs and local groups

	Number of Scale-Up Programs that Collaborated With…	Percentage of Scale-Up Programs that Collaborated With…
In-School Groups	342	57.9%
Out-of-School Groups	125	21.2%
Community Groups	97	16.4%
Volunteer Groups	88	14.9%
Other Groups	43	7.3%

Teacher/leaders described collaborating specifically with other teachers from a variety of different grade levels and subjects, school administrators and staff, experts from local colleges and universities, Iowa State extension offices, and parent volunteers. Teacher/leaders also collaborated with 4-H programs, local businesses, college and university staff, and other local and regional teams in the area. See Appendix O for a complete list of comments detailing collaboration efforts.

Local involvement At the local level, about one-fourth of teacher/leaders reported receiving media coverage and community support, and about half reported a local interest in STEM programming (Figure 58). Other sources of local involvement included support from business and industry and receiving additional funding or resources.

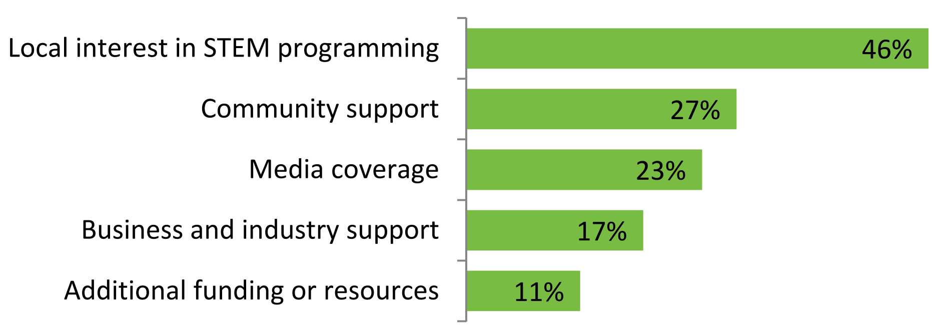


Figure 58. Local level support to Scale-Up programs

Challenges, barriers, and recommendations to others In an open-ended question, respondents described challenges and barriers they faced during Scale-Up implementation. Some of the challenges and barriers reported included:

- lack of time to implement the program;
- time it takes to prepare the lessons for implementation;
- lack of materials for all the students; materials received late; storing materials;
- changes in administration or in teachers who would implement the programs;
- delays caused by snow days and other weather;
- students not having enough background knowledge;
- program materials were too advanced for students (particularly for elementary students); and/or
- not enough computers available for the participating students, slow computers, or incompatible versions of software; and building partnerships with colleges and local industries.

See Appendix O for a complete list of comments detailing teacher/leaders' challenges and barriers related to the implementation of Scale-Up programs.

Respondents also shared recommendations of things they found helpful during the implementation of their program. Many mentioned building a network of fellow teachers, school administrative support, engineers, industry volunteers, other regional and state teams, and local colleges and universities that helped smooth the implementation process. Respondents recommended participating in program training and professional development, taking advantage of resources (e.g., handouts, the teachers' manual, email support, websites, mentors, and service providers) provided by the program, and preparing for implementation by practicing the experiments ahead of time. Many of the respondents found the materials to be complete and helpful in implementing the programs. See Appendix O for a complete list of comments detailing Teacher/Leaders recommendations for implementing Scale-Up programs.

Program Outcomes

Teacher/leaders were asked to report gains in their skills and confidence in teaching STEM-related content; whether they used or developed school-business partnerships in implementing their programs, the number of school-business partnerships, and a description of the most used relationship; and observed outcomes resulting from the program.

Teacher/Leader gains in knowledge, skills, and confidence Teacher/leaders reported that they gained skills and confidence in teaching STEM topics as a result of their participation (Table 40). Over 75% of the Teacher/Leaders agreed or strongly agreed that they now have more confidence to teach STEM content (80%), have increased their knowledge in STEM (83%), are better prepared to answer students' STEM-related questions (78%), and have learned effective methods for teaching in STEM-content areas (76%).).

Table 40. Teacher/leader gains in knowledge, skills, and confidence in STEM topics as a result of participating in Scale-Up programs

	Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree
I have more confidence to teach STEM topics.	41.3%	38.3%	15.2%	1.4%	1.1%	2.7%
I have increased my knowledge of STEM topics.	45.5%	37.5%	12.8%	1.2%	0.7%	2.3%
I am better prepared to answer students' questions about STEM topics.	39.1%	38.6%	15.2%	3.2%	1.6%	2.3%
I have learned effective methods for teaching STEM topics.	39.9%	35.8%	17.1%	3.6%	1.2%	2.5%

School-business partnerships The Scale-Up programs often incorporated business partnerships to give students enhanced opportunities to learn about STEM topics. Ninety-three teacher/leaders reported that they used a previously established school-business partnership in their area, and 84 indicated that they developed a new partnership to implement their Scale-Up programs. Fifty were unable to find either a new or existing school-based partnership to use with their Scale-Up programs. Finally, 366 programs did not require a school-business partnership.

In total, teacher/leaders reported working with an estimated 750 existing business partnerships and 167 new school-business partnerships during 2013-2014. Some of the larger schools reported having more than 50 existing partnerships, while others had only one or two. Among teacher/leaders who reported new partnerships, most had established only one new partnership, although some developed five or more.

In an open-ended question, the teacher/leaders described the nature of the school-business partnerships they used most in implementing their Scale-Up programs. Many businesses provided guest speakers who described their jobs and their organizations to the students, and industry-based volunteers served as mentors. Some provided funding for STEM projects, equipment, marketing materials, space for meetings and practice, and transportation and snacks for students. Others helped implement Scale-Up activities or sponsored on-site field trips. Teacher/leaders wrote that it was often difficult to establish new partnerships themselves while teaching and working to build effective programs. Teacher/leaders suggested that they could use more help from school administrators in developing these relationships. They also indicated that it was hard at times to coordinate schedules so that business partners could participate. See Appendix P for a complete list of comments related to school-business partnerships.

Expectations Teacher/leaders reported observing positive outcomes as a result of the Scale-Up programs, with 87% of them responding that the outcomes they observed met or exceeded their expectations. Less than 6% of the teacher/leaders reported that the outcomes did not meet their expectations. When expectations were not met, teacher/leaders reported several factors, including: some students were not motivated or excited; many teachers noted time constraints; both students and teachers expected that the programs would be more inquiry-based rather than step-by-step experiments; and participants' organizational and leadership skills were lacking. See Appendix P for a complete list of comments related to whether outcomes observed met expectations.

Observed outcomes From a list of specific outcomes, over 80% of the teacher/leaders reported observing an increase in both awareness and interest in STEM topics, while over 50% self-reported observing an increase in awareness in STEM careers and increased student achievement in STEM topics (Figure 59). Approximately 40% of teacher/leaders observed increased interest in STEM careers and about a third reported increased interest in post-secondary STEM opportunities. More than 10% reported that they had developed new partnerships between schools and local businesses or used an existing partnership. A few respondents also noted other observable student outcomes, including increased engagement, increased enthusiasm for STEM and science content, and learning to work in teams. Some respondents said new partnerships and public awareness were also observable outcomes of the program. See Appendix P for a complete list of comments related to other observed outcomes.

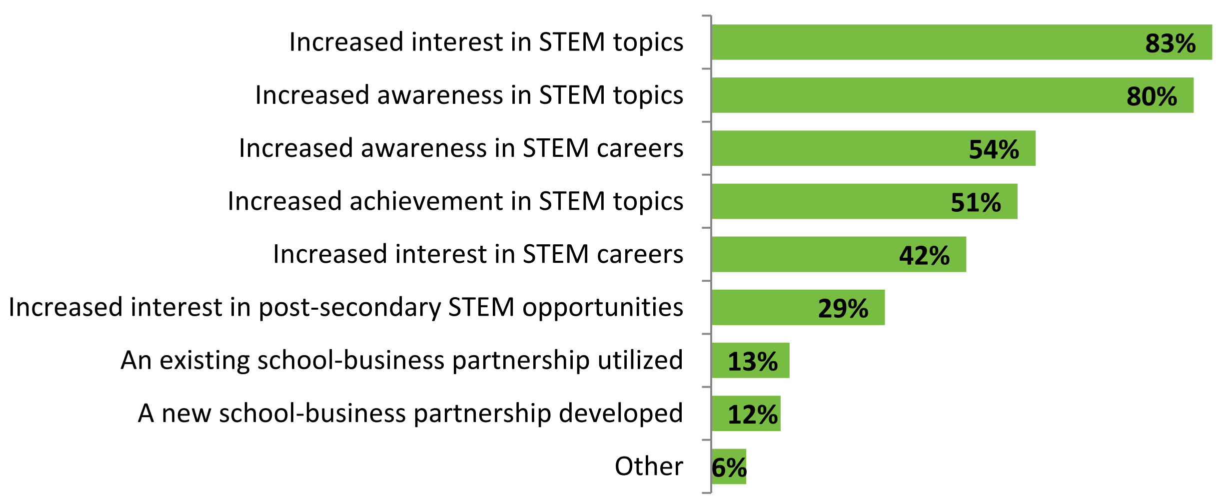


Figure 59. Observed outcomes of the Scale-Up programs

Impact of the Scale-Up programs Respondents also provided examples of the perceived impact the program had on teachers and students. In written comments, many respondents reported that students experienced an apparent increase in motivation, engagement, and interest in STEM content areas as well as in STEM careers. They also thought that students' critical thinking, problem solving, and teamwork skills showed improvement throughout the program. The hands-on activities allowed students to explore their ideas and teachers said that their students evidenced more thinking like scientists and engineers. Applying their knowledge of math, science, and technology to real-world problems also had a positive impact on students and some teachers saw an improvement in test scores. Teachers reported that the program allowed students to explore hands-on learning, which encouraged students to continue work on projects even after programming had ended. See Appendix P for a complete list of comments related to the impact of the Scale-Up programs.

One leader wrote:

> *"One of the obstacles we face in Girl Scouts is parent volunteers who want to lead the girls to the right answer or do the work for them. During the Real Einstein event at [location], we had a parent volunteer observing the Skimmer activity that was being facilitated by an education student. The parent complained to one of our staff that the girls were not getting enough direction on how to put it together so it would work. As the girls worked on the project and worked on redesign, to get a better result, the parent saw how the girls were learning from their mistakes. The parent later apologized to our staff person saying how amazed she was at how creative the girls were in their problem solving. She said she had an a-ha moment of letting them learn by doing. During our Innovate and Create event, girls were working on the Jet Toy. As girls went through the process, they had an opportunity to test the Jet Toy for speed and distance on a large track out in the open. Many people stopped to watch the girls test their Jet Toys. One group of girls was making some adaptation to their design when asked by an adult passing by what they were doing. The girls were wearing their team badges, and each girl went on to describe her role. Later in the day one of the girls went to the John Deere booth where they were making employment badges for the girls that said "Future Engineer" and asked if hers could say "Test Engineer" instead. She went on to explain that she was the Test Engineer for her Jet Toy group and that is what she is going to be when she grows up."*

Other teachers wrote:

> *"Students were to create a video showing how project based learning has impacted their classroom; this was completely optional. Two of the skits created and performed included the use of STEM in connection with project-based learning. In the one video the student … had the class say what each letter in STEM stood for. The other video also used STEM as a direct connection and*

showed examples. Also my students now connect many of our day-to-day lessons to STEM and can identify how things we are learning are connected to science, technology, engineering, and math. I have found sometimes they get a bit worried if they cannot figure out right away how something connects to each area. As a teacher, this has been wonderful to watch and I KNOW this class will continue to make connections to STEM after they leave my class."

"Students are becoming more and more confident doing STEM activities (i.e., asking questions, planning a design, testing their design, etc., basically, the engineering cycle). Students are learning to engage with STEM concepts at younger ages, making it easier to challenge students in the upper grades. It has enabled our district to better "hone" and align our standards."

"Students definitely showed an excitement for working with programming and animation. They were very engaged and tackled the challenges that went with learning how to use programming language. There have been a couple of students who have asked about learning some more this summer on how to code and program. Their awareness for STEM has increased. Due to a lack of STEM opportunities in our building, this program opened up doors for students that probably would have been left closed without the participation in these types of activities."

Unexpected results Finally, respondents were asked to describe any unexpected experiences during implementation or any unexpected results (either positive or negative) of the program. Positive results included:

- increased confidence, pride, and engagement among students (particularly girls) and teachers;
- students now considering STEM careers;
- students thinking and processing information more deeply and with richer outcomes;
- students taking their roles in the programs very seriously and learning to work together;
- the number of students who stuck it out for the entire program; and
- non-participating teachers who were impressed with what the students were doing and accomplishing.

Some negative experiences included:

- late distributions of resources and materials,
- faulty materials (including high mortality of live organisms during shipping),
- students dropping out of the club/program before completing their projects,
- more participants than resources or time allowed,
- limitations due to bad weather,

- the number of students lacking the ability to work together with their peers in a group,
- the level of difficulty of the material and experiments, and
- that some students did not have enough background knowledge.

See Appendix P for a complete list of comments related to unexpected results.

Section 4.2 Report of participant information

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

Key findings

There were 26,238 students on student participant lists submitted to Iowa Testing Programs, of which 18,156 had matches to Iowa Assessments regardless of STEM Interest Inventory participation (74.3% match rate). Of these, 48% were females and 52% males. The distribution of students by race/ethnicity was 80% white, 9% Hispanic, 5% Black/African American, and 6% Other. This was a small increase in the distribution of females and under-represented minorities from Year 1, which was 44% females to 56% males, and 87% White, 6% Hispanic, 3% Black, and 4% Other, respectively.

Among the 18,156 students matched to Iowa Assessments records, 9,352 had matches to the STEM Interest Inventory (35.6% match rate) and of those, 8,508 included grade designations. Figure 60 shows the distribution of students by grade level (n=8,508).

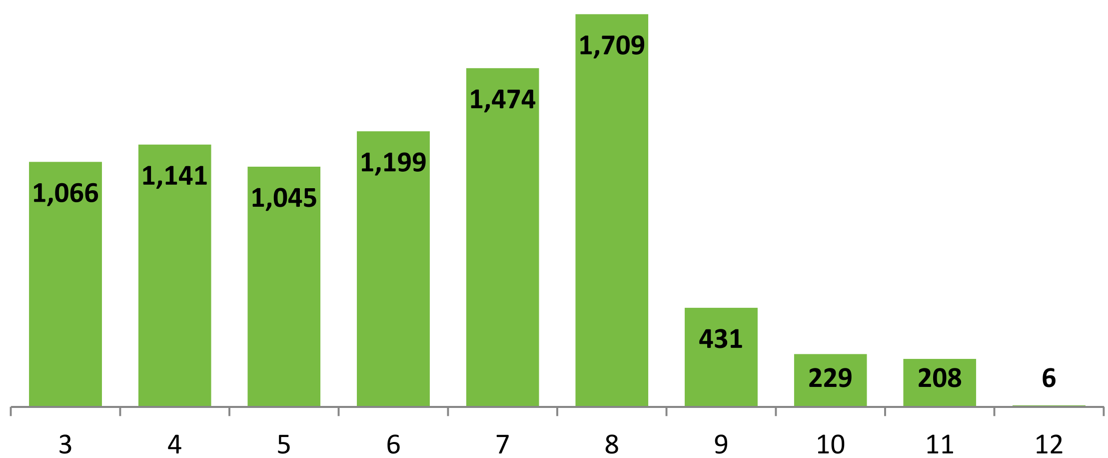


Figure 60. Number of matched Scale-Up participants by grade

Among the matched Scale-Up participants, 30% were Carolina STEM participants; 21% Project Lead the Way: Gateway to Technology Program; 19% Engineering is Elementary in Iowa (EiE); 17% A World in Motion (AWIM); 4% The “CASE” for Agricultural STEM Education in Iowa (CASE) and for Defined STEM; 3% Hyperstream – Technology Hub for Iowa Students; 1% Camp in a Can Show and Tell; and 0.3% E=HC^2 Exploration Health Careers (Figure 61).

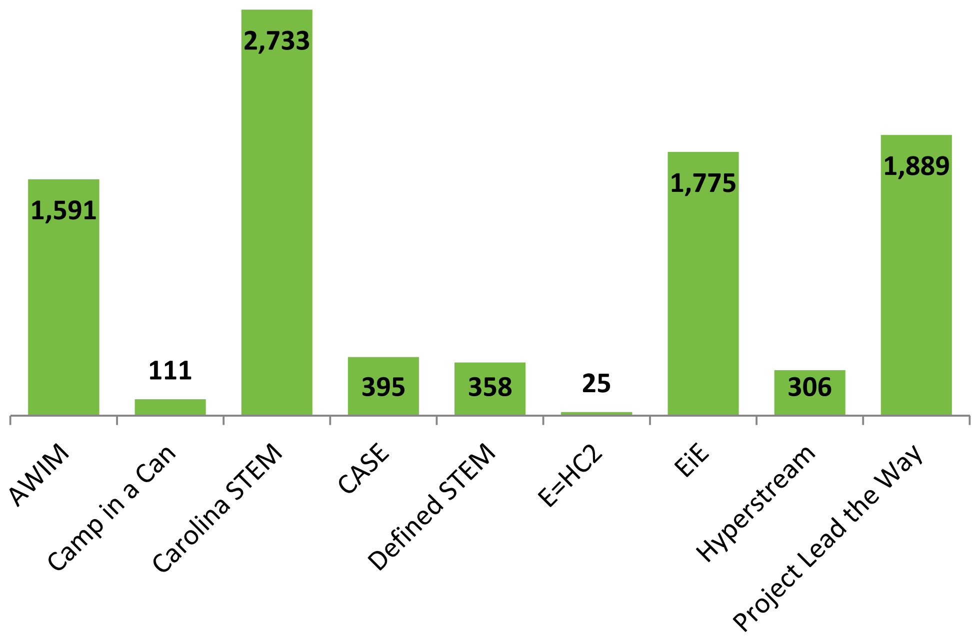


Figure 61. Number of matched participants by Scale-Up program

STEM Interest among Scale-Up students versus students statewide

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

- For students in grades 3-5 and grades 6-8, there is very little difference in interest in STEM topics and STEM careers between Scale-Up participants and students statewide (Figure 62 and Figure 63, respectively).
- For grades 9-12, students participating in Scale-Up programs showed more interest in STEM topics and STEM careers than students statewide (Figure 64).

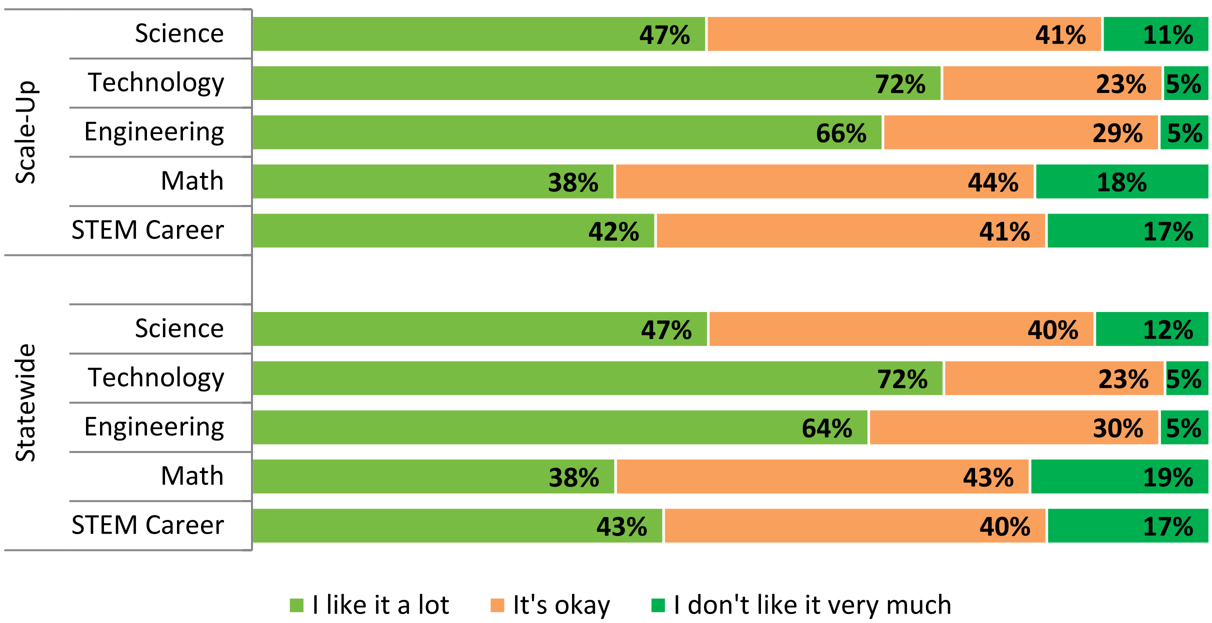


Figure 62. Interest in STEM topics and careers for *grades 3-5* Scale-Up students and students statewide, 2013-2014

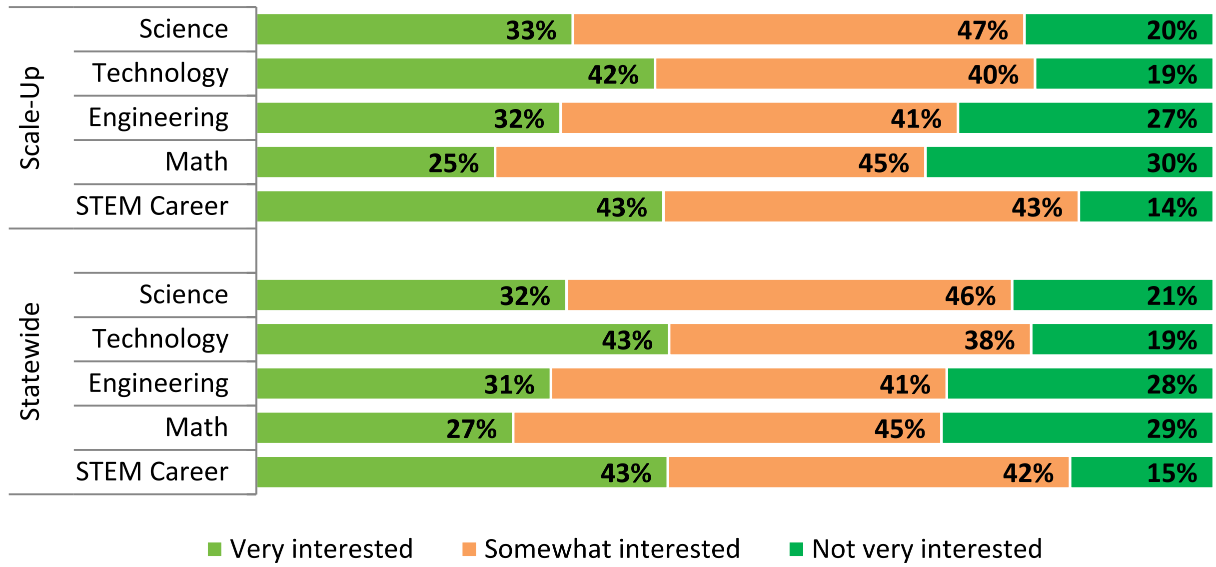


Figure 63. Interest in STEM topics and careers for *grades 6-8* Scale-Up students and students statewide, 2013-2014

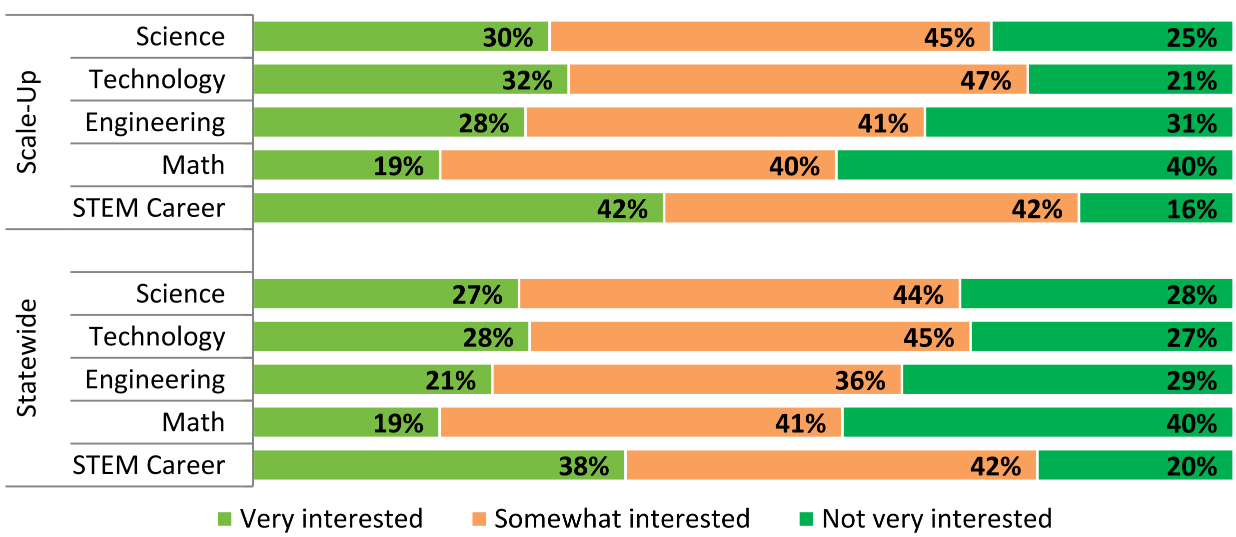


Figure 64. Interest in STEM topics and careers for *grades 9-12* Scale-Up students and students statewide, 2013-2014

Achievement in math and science on the Iowa Assessments, Scale-Up student versus statewide comparison

The matched Scale-Up participants were also compared to students statewide with regard to achievement in math and science. The Iowa Assessment scores in these two subjects were compared using National Percentile Rank (NPR). In 2012-2013, 6,225 students (females=44.3%, males=55.7%) were matched to their Iowa Assessment scores. For 2013-2014, 18,156 students (females=48.3%, males=51.7%) on student participant lists were matched to Iowa Assessments scores, and compared with the scores of 346,774 students statewide who took the exams. Note that comparisons reflect association between Scale-Up Programs and achievement in science and math only, not causation. Therefore, these findings should be interpreted with caution.

- The differences in National Percentile Rank between students in Scale-Up programs and students statewide have diminished from Year 1 to Year 2. For 2013-2014, there are no differences in NPR in *math* (Table 41), and only a one percentage point difference in NPR in *science* (Table 42).
- This is in contrast to Year 1 (2012-2013), where Scale-Up participants scored more than students statewide, an average of 10 percentage points better in National Percentile Rank in *math*, and an average of 8 percentage points better in National Percentile Rank in *science*.
- The original difference may have been a function of students with more interest and aptitude participating in Scale-Up programs in Year 1. As more students statewide participate in STEM programs, these initial differences are no longer observed.

Table 41. *Math* achievement by grade level on the Iowa Assessments, statewide versus Scale-Up student comparison

Grade	All Iowa Students[1]				Scale-Up Students[2]				Difference (NPR)	
	Math Scores		NPR		Math Scores		NPR			
	2012/13	2013/14	2012/13	2013/14	2012/13**	2013/14	2012/13**	2013/14	2012/13	2013/14
3	179	181	58	62	181	178	62	56	+4	-6
4	196	198	58	62	203	200	71	66	+13	+4
5	210	213	57	62	217	209	66	56	+9	-6
6	221	226	53	58	226	228	58	61	+5	+3
7	238	244	57	62	256	242	74	61	+17	-1
8	252	256	58	61	255	255	61	61	+3	0
9	271	270	65	64	279	272	72	66	+7	+2
10	281	283	65	67	298	285	79	69	+14	+2
11	289	294	65	70	310	297	82	72	+17	+2
Average*	--	--	60	63	--	--	69	63	+10	0

NPR=National Percentile Rank

1. Statewide student achievement data based on n=342,494 for 2012-2013, and n=346,774 for 2013-2014, respectively.

2. Scale-Up student achievement data based on n=6,225 for 2012-2013, and n=18,156 for 2013-2014, respectively.

*Note: Averages are only reported for National Percentile Rank. The scoring range of math and science scores vary by grade level which prevents the ability to average scores across grades.

** In June 2014, ITP provided updated 2012-2013 math and science achievement scores and NPR for Scale-Up students regardless of Interest Inventory participation; this reflects a larger sample than used to report achievement in the ISMP, Year 1 report.

Table 42. *Science* achievement by grade level on the Iowa Assessments, statewide versus Scale-Up student comparison

Grade	All Iowa Students[1]				Scale-Up Students[2]				Difference (NPR)	
	Science Scores		NPR		Science Scores		NPR			
	2012/13	2013/14	2012/13	2013/14	2012/13**	2013/14	2012/13**	2013/14	2012/13	2013/14
3	182	183	62	64	184	181	66	61	+4	-3
4	202	204	66	67	211	208	75	73	+9	+6
5	213	215	59	60	222	212	69	58	+10	-2
6	226	228	58	59	234	230	66	62	+8	+3
7	240	245	59	63	257	245	72	63	+13	0
8	256	264	61	67	259	264	63	67	+2	0
9	279	274	71	66	290	278	78	70	+7	+4
10	291	283	73	67	308	285	82	69	+9	+2
11	297	292	71	68	319	297	84	71	+13	+3
Average*	--	--	64	65	--	--		66	+8	+1

NPR=National Percentile Rank

1. Statewide student achievement data based on n=342,494 for 2012-2013, and n=346,774 for 2013-2014, respectively.

2. Scale-Up student achievement data based on n=6,225 for 2012-2013, and n=18,156 for 2013-2014, respectively.

*Note: Averages are only reported for National Percentile Rank. The scoring range of math and science scores vary by grade level which prevents the ability to average scores across grades.

** In June 2014, ITP provided updated 2012-2013 math and science achievement scores and NPR for Scale-Up students regardless of Interest Inventory participation; this reflects a larger sample than reported in the ISMP, Year 1 report.

Section 4.3 Scale-Up Program Student Survey

Data source Student Survey, Iowa STEM Monitoring Project; Provided by Center for Social and Behavioral Research, University of Northern Iowa

Key findings

For 2013-2014, 21,350 student questionnaires were returned (Table 43). Of these, 11,002 were completed by male participants (51.8%) and 10,248 by female (48.2%). The average age of participants was 11.2 years (range: 4-19 years). Elementary students (ages 4-10 years old) returned 39.5% of the total sample of questionnaires (n = 8,340), followed by middle school students (ages 11-13 years old; 37.8%, n = 7,995) and high school students (ages 14-19 years old; 22.7%, n = 4,794), respectively.

Table 43. Demographic characteristics of Scale-Up student survey respondents

	n	(%)
TOTAL	**21,350**	
Gender		
Male	11,002	(52%)
Female	10,248	(48%)
Iowa STEM Hub Region		
Northwest	6,295	(30%)
North Central	3,738	(18%)
Northeast	3,812	(18%)
Southwest	2,202	(10%)
South Central	2,416	(11%)
Southeast	2,887	(13%)
Scale-Up Program		
A World in Motion	5,208	(24%)
Camp in a Can	570	(3%)
Carolina STEM Curriculum	7,510	(35%)
"CASE" for Agricultural STEM Education	649	(3%)
Defined STEM	908	(4%)
Health Careers Connections (E=HC^2)	41	(<1%)
Engineering is Elementary	3,183	(15%)
HyperStream	306	(1%)
Project Lead the Way	2,969	(14%)
Not specified	6	
Age Group		
Elementary school (4-10y)	8,340	(39%)
Middle school (11-13y)	7,995	(38%)
High school (14-19y)	4,794	(23%)
Not specified	221	

Table 44. Gender and mean age of respondents by Scale-Up program

Scale-Up Program	Male N (%)	Female N (%)	Mean Age *M*	Mean Age *SD*
A World in Motion	2,628 (50.7)	2,554 (49.3)	10.6	2.5
Camp in a Can	261 (46.5)	300 (53.5)	7.7	1.6
Carolina STEM Curriculum	3,818 (51.2)	3,643 (48.8)	11.0	2.7
"CASE" for Agricultural STEM Education	405 (62.6)	242 (37.4)	15.9	1.2
Defined STEM	452 (49.9)	454 (50.1)	13.6	2.4
Health Careers Connections ($E=HC^2$)	16 (39.0)	25 (61.0)	17.0	0.8
Engineering is Elementary	1,658 (52.2)	1,517 (47.8)	9.0	1.6
HyperStream	207 (67.9)	98 (32.1)	14.7	2.1
Project Lead the Way	1,553 (52.4)	1,413 (47.6)	13.2	0.9

Note: Sums not equal to 21,350 due to missing data.

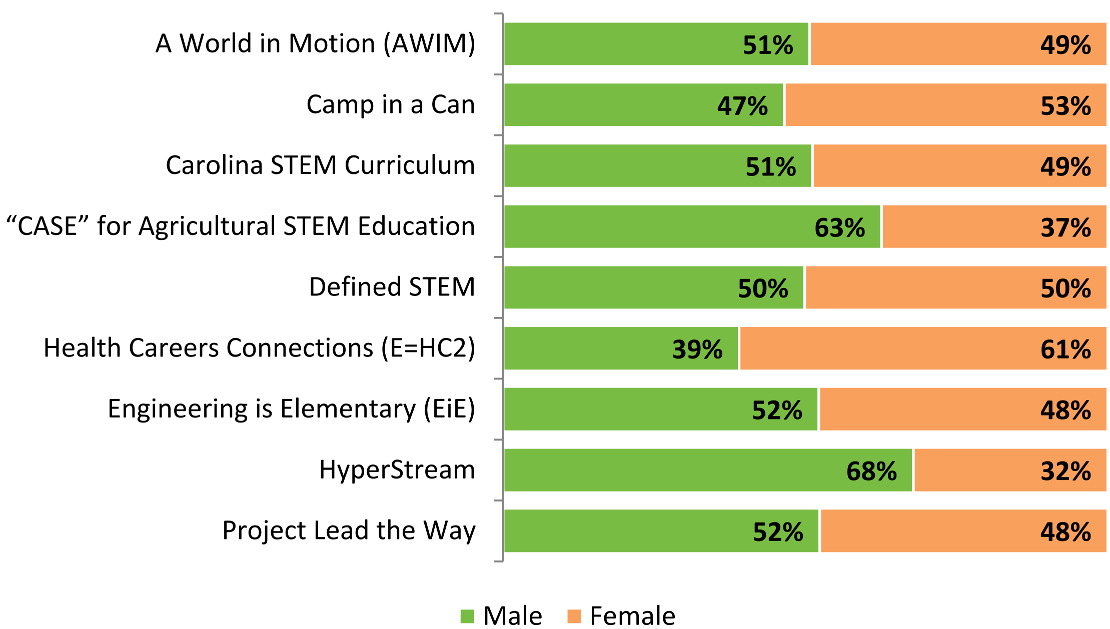


Figure 65. Proportion of male and female respondents by Scale-Up program

A statistically significant larger proportion of elementary students said they were more interested in STEM topics and in STEM careers compared to middle school and high school students (Figure 66) after Scale-Up participation:

- Elementary school students were significantly more interested in both STEM topics and STEM careers than middle- or high-school students (p<.001 for all).
- Middle school students were significantly more interested in STEM careers than high school students (p<.05), but were significantly less interested in STEM careers than elementary students (p<.001).
- The majority of elementary students said that they were "more interested" in STEM topics and careers following Scale-Up participation.
- A reminder that these findings should be interpreted with caution as there was no baseline survey; therefore, this may be a function of the initial interest, not necessarily of participation.

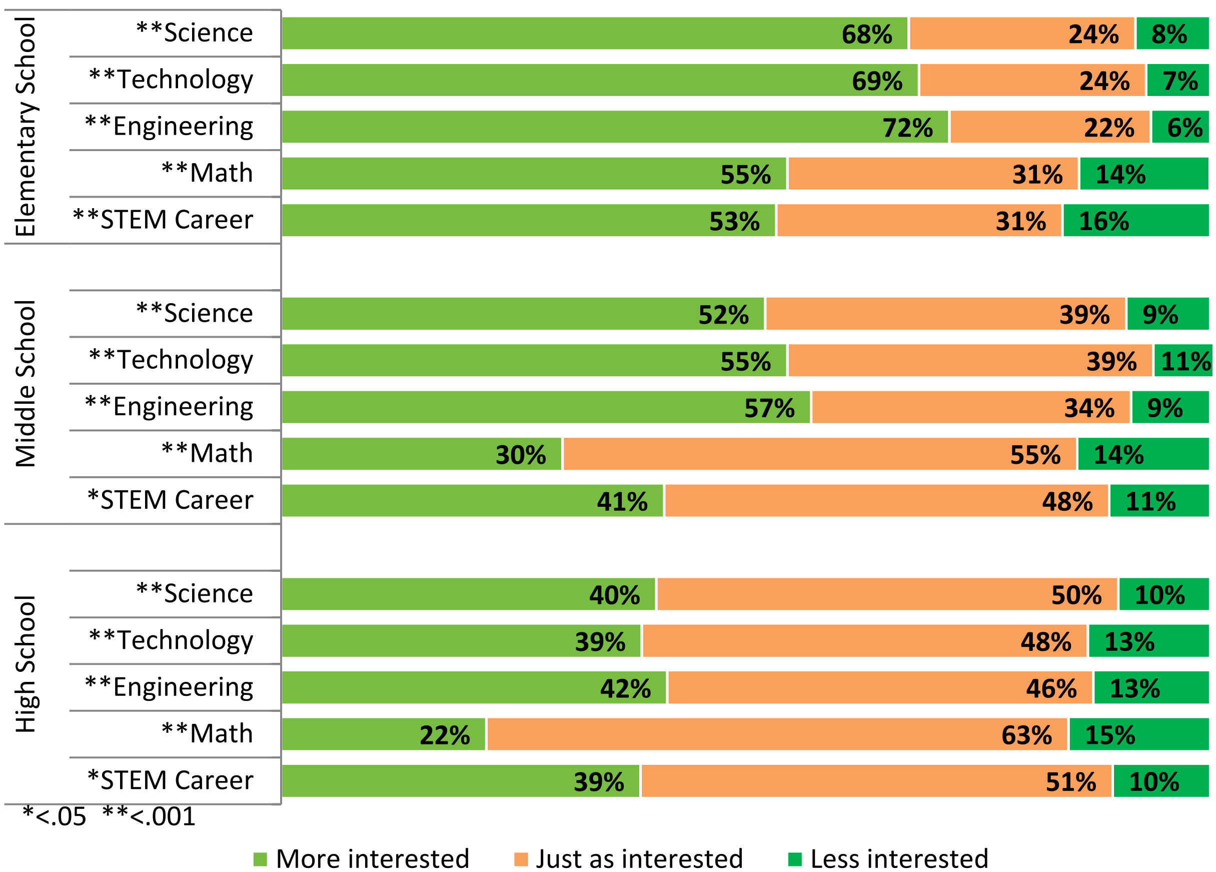


Figure 66. Percentage of student respondents by grade group who were *'more interested,' 'just as interested,'* and *'less interested'* in STEM topics/careers after participating in a Scale-Up program

Statistically significant differences were found between males and females in their reported interest in STEM topics and careers across all age groups.

For elementary students (Figure 67),

- Males were significantly more interested in math than females (p<.001).
- There were no significant differences in interest between males and females in all other STEM topics or in STEM careers.
- Both males and females were most interested in science, technology, and engineering.

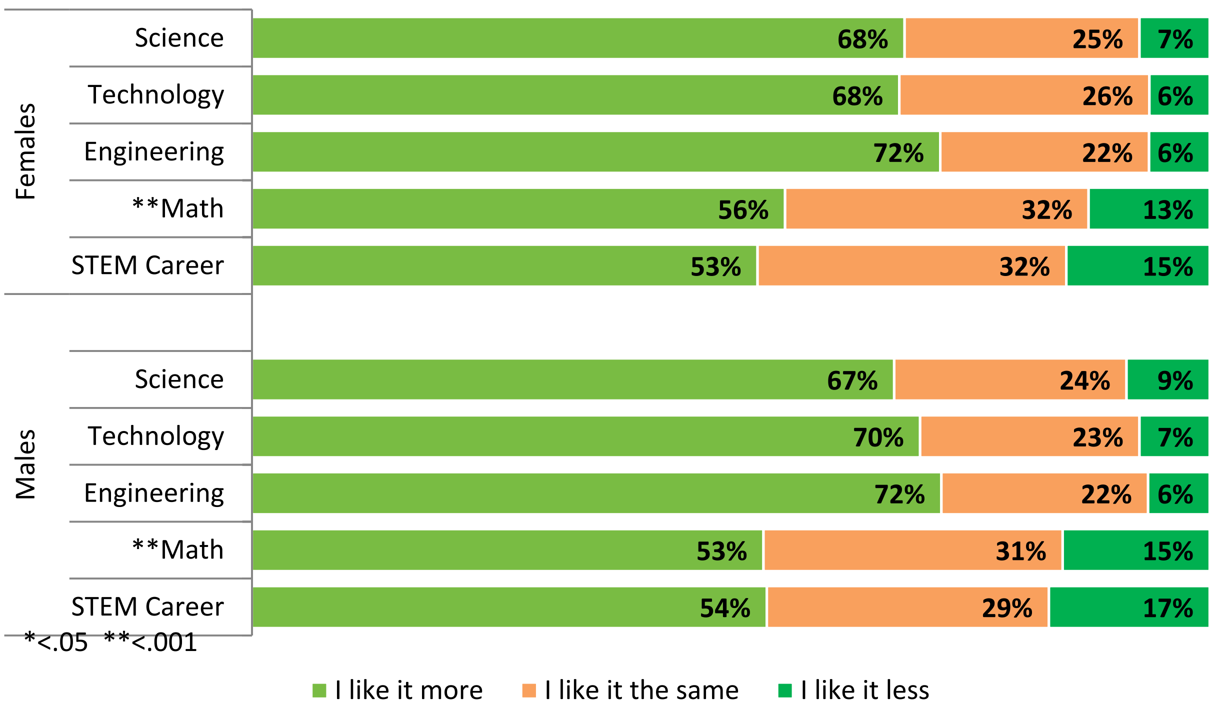


Figure 67. Interest among male and female student respondents, *aged 4-10 years*, in STEM topics/careers after participating in a Scale-Up program

For middle school students (Figure 68),

- Males were significantly more interested in science, technology, engineering, and STEM careers than females (p<.001), as well as more interested in math (p<.05).
- Males were most interested in engineering, technology, and science; females were most interested in engineering and science.
- For both males and females, the majority reported being “just as interested” in math and STEM careers after Scale-Up participation.

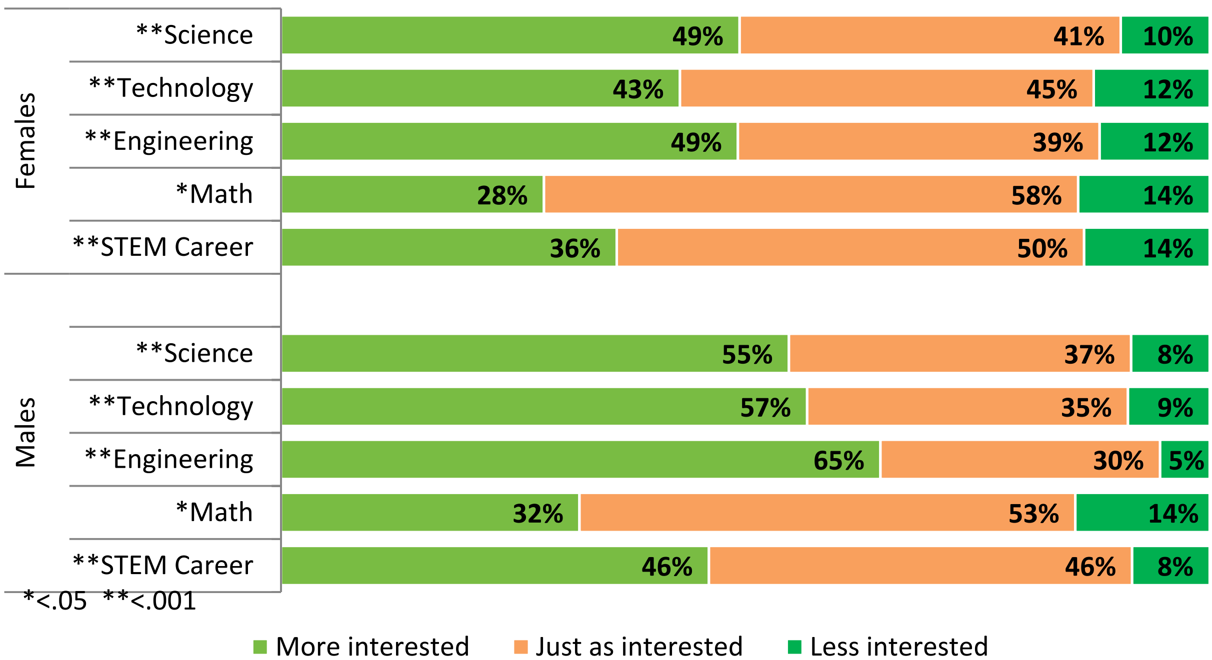


Figure 68. Interest among male and female student respondents, *aged 11-13 years*, in STEM topics/careers after participating in a Scale-Up program

For high school students (Figure 69),

- Males were significantly more interested in science, technology, engineering, and STEM careers than females (p<.001).
- There was no significant difference between males and females in math interest.
- Most females reported being “just as interested” in all STEM topics and in STEM careers since the start of the Scale-Up program.
- Most males were more interested in engineering and technology and for math, science, and STEM careers, most males reported being “just as interested.”

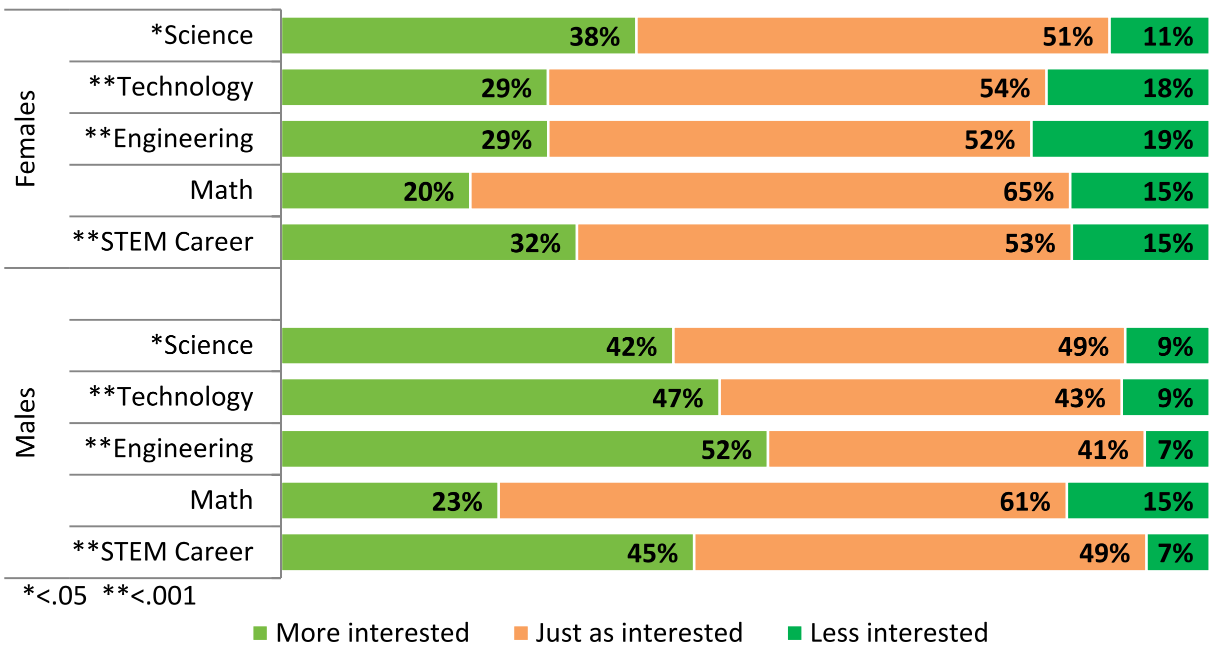


Figure 69. Interest among male and female student respondents, *aged 14-19 years*, in STEM topics/careers after participating in a Scale-Up program

- Overall, combining students' reported change in interest across any STEM topic areas or in pursuing a STEM career, 88.1% of students said they were "more interested" in at least one STEM topic or in STEM careers after participating in a Scale-Up program. Another 10.9% said they were "just as interested" in STEM topics or in STEM careers after participating, and only 0.7% said they were "less interested" (Figure 70).
- Among students who participated in a Scale-Up program in 2012-2013 and 2013-2014, 9 in 10 participants reported higher interest in at least one STEM subject or in a STEM career following the program participation.

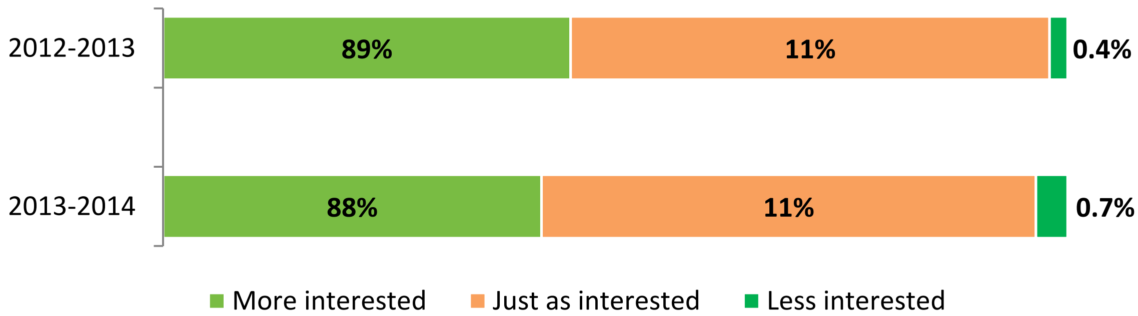


Figure 70. Percentage of student respondents who were '*more interested,' 'just as interested', or 'less interested'* in at least one STEM topic or in STEM careers by survey year

Student Interest in STEM by Scale-Up Program

Among the Scale-Up Programs implemented in 2013-2014, all of the programs had a positive effect on student interest and awareness in STEM topics and STEM careers. The following graph shows the percent of students who said they were “more interested”, “just as interested”, or “less interested” in STEM subjects or careers by Scale-Up program.

It is important to note that Scale-Up programs vary in their emphasis across individual STEM topics with some programs focusing on all for individual STEM topics and/or careers, where other programs might have only one or two areas of emphasis. For example, an engineering-based program may not include any math-based learning within their curriculum. This would likely affect how a student reports their change in interest in engineering, but not in math. Therefore, these findings should <u>not</u> be used to compare one program against another. Rather, the utility in these findings may be in identifying programs that are strong in the STEM subject area(s) that align with a particular school or organization’s desired goals and objectives. These may include choosing to implement a program with emphasis in a single STEM-topic area (e.g. just science), a few STEM-topic areas (e.g. engineering & technology), or all STEM topics and careers.

- Across all programs, the majority (78-100%) of students who participated in a Scale-Up program said they were “more interested” or “just as interested” in STEM topics and in STEM careers after participating in any Scale-Up program (Figure 71).
- Very few students reported being “less interested” in STEM topics or in STEM careers after participating in any Scale-Up program (less than or equal to 23% of students for any program).

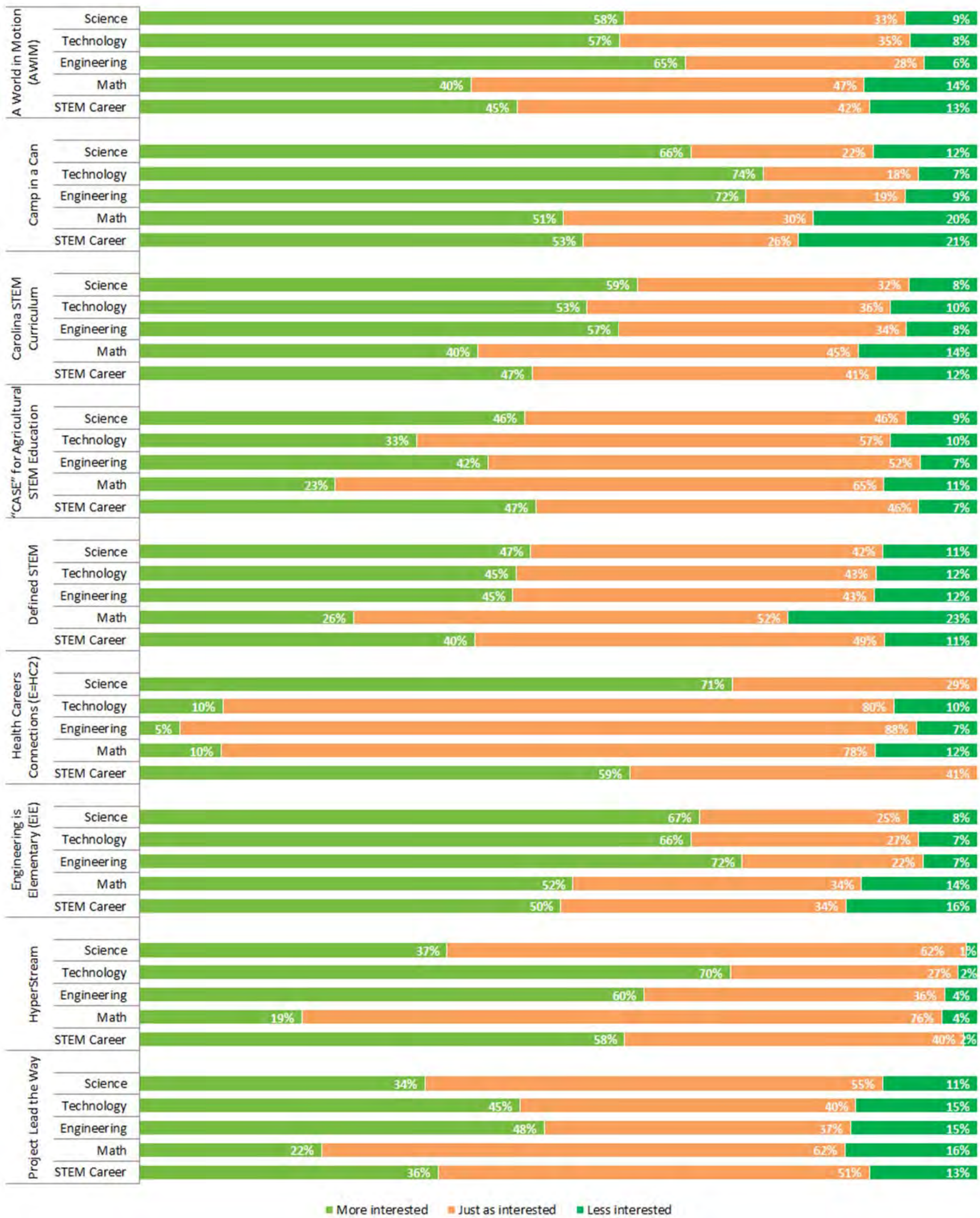


Figure 71. Interest of Scale-Up student respondents in STEM topics and careers after Scale-Up participation by program

Student Characteristics and Participation by Iowa STEM Hub Region

The number of students who participated in Scale-Up programs varied by Iowa STEM Hub region in terms of gender, age group, and type of Scale-Up program.

- Across all STEM Hub regions, respondents to the student survey were approximately 50% male and 50% female (Table 45).
- Across all Iowa STEM Hub regions, most students were elementary and middle school age.
- Only the North Central Hub region had students participate in all the different Scale-Up programs.
- Most Scale-Up programs had more male participants than female participants.
- The mean age of participants ranged from 7.6 years (Camp in a Can) to 17.03 years ($E=HC^2$).

Table 45. Characteristics of student survey respondents by Iowa STEM Hub region

	Northwest		North Central		Northeast		Southwest		South Central		Southeast	
	N	**(%)**	**N**	**(%)**	**N**	**(%)**	**N**	**(%)**	**N**	**(%)**	**N**	**(%)**
Gender												
Male	3,207	(51.2)	1,935	(51.9)	1,874	(49.4)	1,143	(52.3)	1,310	(54.4)	1,533	(53.4)
Female	3,060	(48.8)	1,790	(48.1)	1,917	(50.6)	1,041	(47.7)	1,100	(45.6)	1,340	(46.6)
Scale-Up Program												
A World in Motion	1,328	(21.1)	1,217	(32.6)	1,170	(30.7)	574	(26.1)	491	(20.3)	428	(14.8)
Camp in a Can	--	--	156	(4.2)	171	(4.5)	100	(4.5)	73	(3.0)	70	(2.4)
Carolina STEM Curriculum	2,497	(39.7)	882	(23.6)	1,402	(36.8)	1,040	(47.2)	562	(23.3)	1,127	(39.0)
"CASE" for Agricultural STEM Education	113	(1.8)	239	(6.4)	159	(4.2)	41	(1.9)	70	(2.9)	28	(1.0)
Defined STEM	359	(5.7)	394	(10.5)	--	--	--	--	131	(5.4)	24	(0.8)
Health Careers Connections ($E=HC^2$)	--	--	41	(1.1)	--	--	--	--	--	--	--	--
Engineering is Elementary	1,402	(22.3)	334	(8.9)	322	(8.5)	144	(6.5)	629	(26.0)	352	(12.2)
HyperStream	17	(0.3)	38	(1.0)	34	(0.9)	52	(2.4)	162	(6.7)	3	(0.1)
Project Lead the Way	579	(9.2)	437	(11.7)	549	(14.4)	251	(11.4)	298	(12.3)	855	(29.6)
Age Group												
Elementary School (4-10y)	2,325	(37.3)	1,231	(33.3)	1,621	(43.0)	1,042	(48.0)	982	(40.9)	1,139	(39.8)
Middle School (11-13y)	2,310	(37.0)	1,438	(38.9)	1,207	(32.0)	842	(38.8)	1,016	(42.4)	1,182	(41.3)
High School (14-19y)	1,604	(25.7)	1,028	(27.8)	938	(24.9)	285	(13.1)	401	(16.7)	538	(18.8)

Note: Sums not equal to 21,350 due to missing data. Counts and percentages reflect the proportion of completed student questionnaires; not necessarily distribution of overall participation.

Changes in Student Interest from Scale-Up Student Surveys, 2012/2013 – 2013/2014

Nearly three times as many student Scale-Up surveys were returned for the 2013-2014 year compared to the 2012-2013 year (21,350 versus 7,790; Table 46). Because key differences are likely to exist between Scale-Up programs that were implemented in year one compared to year two, it is not appropriate to compare change in interest across years.

- Based on completed student questionnaires, a slightly higher proportion of females participated in the 2013-2014 year than in 2012-2013.

Table 46. Demographic comparison of Scale-Up student survey respondents, 2012-2013 versus 2013-2014

	2012-2013		2013-2014	
	N	**(%)**	**N**	**(%)**
TOTAL	**7,729**		**21,350**	
Gender				
Male	4,181	(54.4)	11,002	(51.8)
Female	3,505	(45.6)	10,248	(48.2)
Iowa STEM Hub Region				
Northwest	1,442	(18.8)	6,295	(29.5)
North Central	1,253	(16.4)	3,738	(17.5)
Northeast	1,749	(22.8)	3,812	(17.9)
Southwest[1]			2,202	(10.3)
South Central	1,559	(20.3)	2,416	(11.3)
Southeast	1,660	(21.7)	2,887	(13.5)
Age Group				
Elementary (4-10y)	2,955	(38.3)	8,340	(39.5)
Middle school (11-13y)	2,588	(33.6)	7,995	(37.8)
High school (14-19y)	2,063	(26.8)	4,794	(22.7)

1. In 2012-2013, data from the Southwest region were excluded due differences in data collection.
Note: Sums not equal to 7,729 or 21,350 due to missing demographic data.
Counts and percentages reflect the proportion of completed student questionnaires; not necessarily distribution of overall participation.

- Across survey years, there is a similar trend in decreased interest in STEM topics and in pursuing STEM careers across age group, with females showing a greater rate of decreased interest than males. There was no statistically significant difference in mean scores from 2012-2013 to 2013-2014 (Figure 72 and Figure 73).
- In general, when considering interest in any STEM topic or in pursuing a STEM career, the decrease in interest that occurs from Elementary in High School is more marked for females.

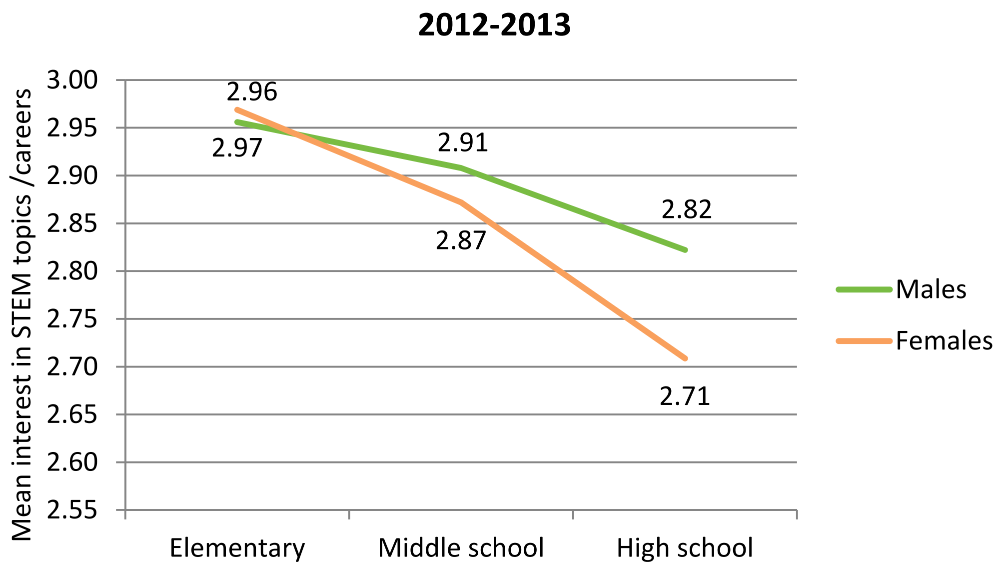


Figure 72. Mean interest in STEM topics and STEM careers by age group and gender among Scale-Up student survey respondents, 2012-2013

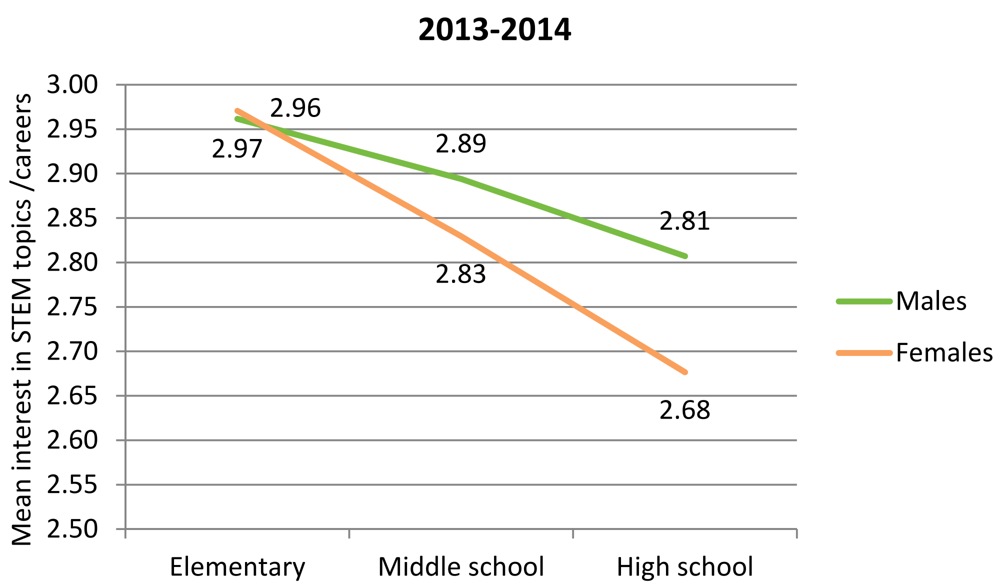


Figure 73. Mean interest in STEM topics and STEM careers by age group and gender among Scale-Up student survey respondents, 2013-2014

Summary & Conclusions

This report presented the second year of data compilation and synthesis of the Iowa STEM Monitoring Project (ISMP). A wide variety of data sources and measures were systematically reviewed to get a better understanding of STEM in Iowa from educational and workforce development perspectives.

Results indicate that math and science achievement (as measured by state and national standardized tests and the ACT) has not changed markedly in the last five years and disparities in math and science achievement have persisted over time. A smaller proportion of underrepresented minority students, those eligible for free/reduced lunch, and students with disabilities are proficient in math and science. For all students statewide and in Scale-Up Programs, interest in the four main STEM disciplines and STEM careers is highest among elementary school students when compared to middle school and high school students.

In 2013, 41% of Iowans had heard of the abbreviation STEM. Recall was highest among Iowans with a 4-year degree or higher (57%) and among Iowans with children in school (37% - 43%). Although "brand awareness" of STEM may be 41%, 61% of Iowans said they had heard something in the past month about "improving math, science, technology, and engineering education" in the state. Most Iowans agreed that increased focus on STEM education will improve the Iowa economy (89%), there are more jobs are available for people with good science and math skills (90%), and more companies would move to Iowa if the state had a reputation for workers with good STEM skills (90%). The majority of Iowans (86%) say there is an urgent need in Iowa for more resources to be put toward STEM education.

Among the 9 Regional Scale-Up Programs in STEM education in 2013-2014, all of the selected programs had positive effects on student interest and awareness in STEM topics and STEM careers. Among students who participated in a Scale-Up program in 2013-2014, 9 in 10 participants reported higher interest in at least one STEM subject or in a STEM career following the program participation. Elementary school students were significantly more interested in both STEM topics and STEM careers compared to middle- or high-school students.

Teachers reported several important impacts as a result of the Scale-Up programs this year. They reported that students demonstrated an increase in motivation, engagement, and interest in STEM content areas as well as STEM careers. They also reported that students' critical thinking, problem solving, and teamwork skills showed improvement throughout the program.

Limitations & Conclusions

The data compiled, collected, and synthesized for this report come from a variety of sources. The data represent a wide range of characteristics, including periods of time, sub-populations, and data collection methods. This variation can lead to difficulty in synthesizing and interpreting the data. Following the benchmarks established in year one, year two showed promise in some indicators and some losses in others. The ISMP will continue to follow these indicators, identify and/or refine other metrics of STEM progress, and strengthen relationships with other data partners in the state. Taken together, this report provides a picture of Iowa's STEM landscape, and how it is evolving following the targeted initiatives of the Iowa Governor's STEM Advisory Council to improve STEM education and workforce development surrounding STEM in Iowa.

[This page intentionally left blank.]

Iowa STEM Monitoring Project

2013-2014 Summary Report Appendices

Report No. 2.2

Prepared for

Iowa Governor's STEM Advisory Council

Prepared by
Erin O. Heiden, PhD, MPH
Mari Kemis, MS
Ki H. Park, PhD, MPH
Mitch Avery, MPP
Disa L. Cornish, PhD, MPH
Mary E. Losch, PhD

With assistance from
Kathleen Gillon, MEd
Matthew Whittaker, PhD
Heather Rickels
Kristin Broussard

This project involved the participation of the Governor of Iowa and the Iowa Governor's STEM Advisory Council, Grant Agreement Number, UNI-CSBR_FY2014_01.

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the Governor of Iowa, the Iowa Governor's STEM Advisory Council, or The University of Northern Iowa.

The authors would like to thank the many individuals and organizations who contributed to this report. This includes great teamwork received from a host of players at ACT, Iowa Department of Workforce Development, and the Iowa Department of Education. In addition, several students at Iowa State University, University of Iowa, and University of Northern Iowa made valuable contributions to this effort. Special thanks to Kathleen Gillon, Heather Rickels, Kristin Broussard, Brock Rozich, Stephanie Strong, Isaiah Corbin, Mizani Johnson and Letetsia Fox for providing valuable assistance. Finally, we especially thank the nearly 1,900 participants of the statewide survey, the almost 600 Scale-Up teachers and leaders, and over 21,000 Scale-Up student participants who shared their time, views, and personal experience about STEM efforts and programming in Iowa. Their generosity of time and thoughtful reflections make this report possible.

For additional information about this project, contact:
Jeffrey Weld | Executive Director
Governor's STEM Advisory Council
214 East Bartlett Hall | University of Northern Iowa
Cedar Falls, IA 50614-0298
319.273.2723 | weld@iowastem.gov
319.273.2959 | www.IowaSTEM.gov | info@IowaSTEM.gov

For additional information about this report, contact:
Mary E. Losch | Director
Center for Social and Behavioral Research | University of Northern Iowa
Cedar Falls, IA 50614-0402
319-273-2105 | www.uni.edu/csbr/ | mary.losch@uni.edu

Author Information:
Erin O. Heiden, PhD, Senior Research Scientist, Center for Social and Behavioral Research (UNI)
Mari Kemis, MS, Assistant Director, Research Institute for Studies in Education (ISU)
Ki H. Park, PhD, Senior Research Scientist, Center for Social and Behavioral Research (UNI)
Mitch Avery, MPP, Project Coordinator, Center for Social and Behavioral Research (UNI)
Disa L. Cornish, PhD, Assistant Professor, Division of Health Promotion and Education (UNI)
Mary E. Losch, PhD, Director, Center for Social and Behavioral Research (UNI)

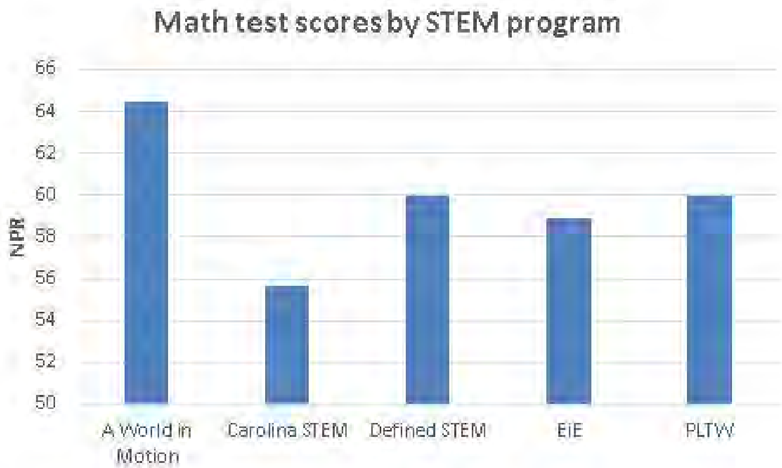
Recommended Citation:
Heiden, E. O., Kemis, M., Park, K. H., Avery, M., Cornish, D. L., & Losch, M. E.. (2014). *Iowa STEM Monitoring Project: 2013-2014 Summary Report.* Cedar Falls, IA: University of Northern Iowa, Center for Social and Behavioral Research.

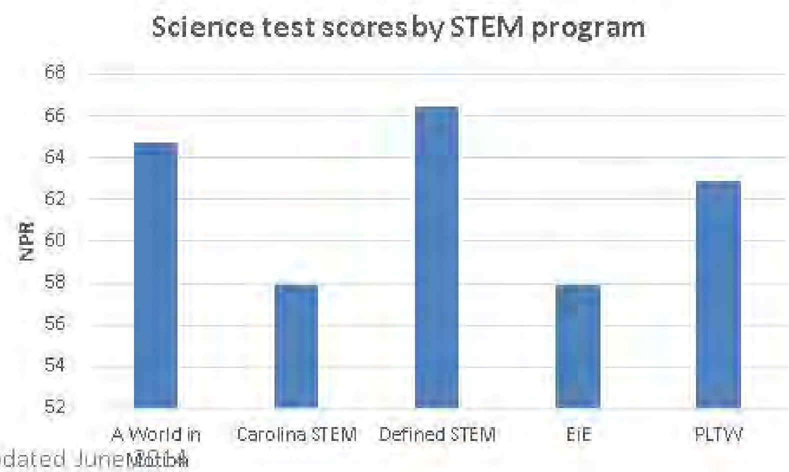
[Space Left Blank Intentionally]

List of Appendices

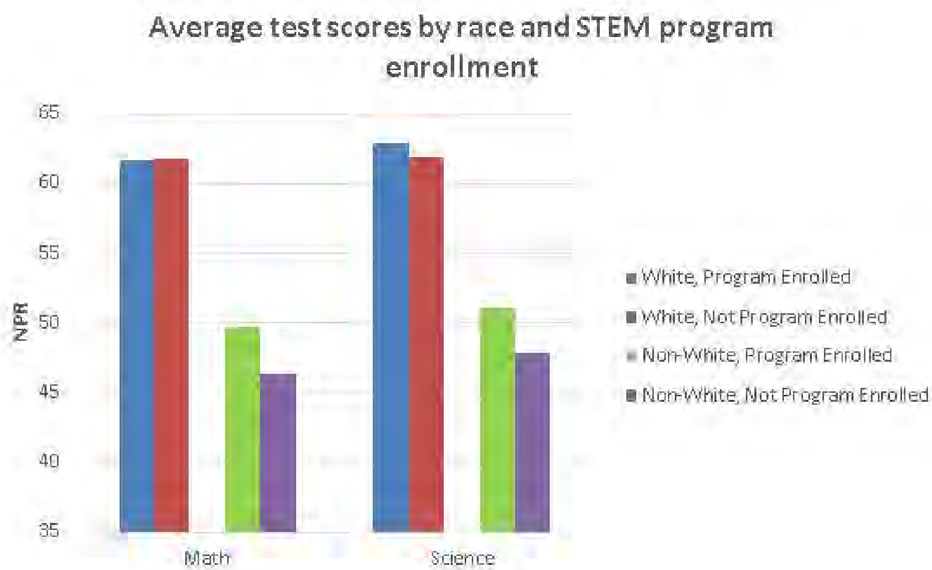
Appendix A: Additional representations Statewide Student Interest Inventory (Indicator 8)

* Only considered programs with at least 175 participants



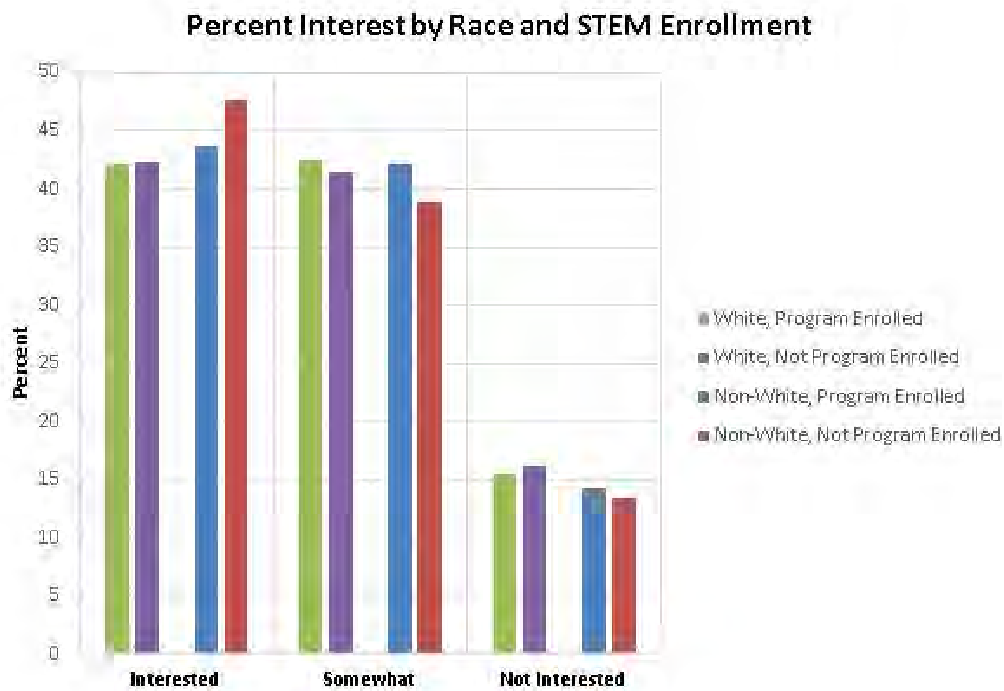


The relationship between STEM program participation and test scores is greater for minority students.



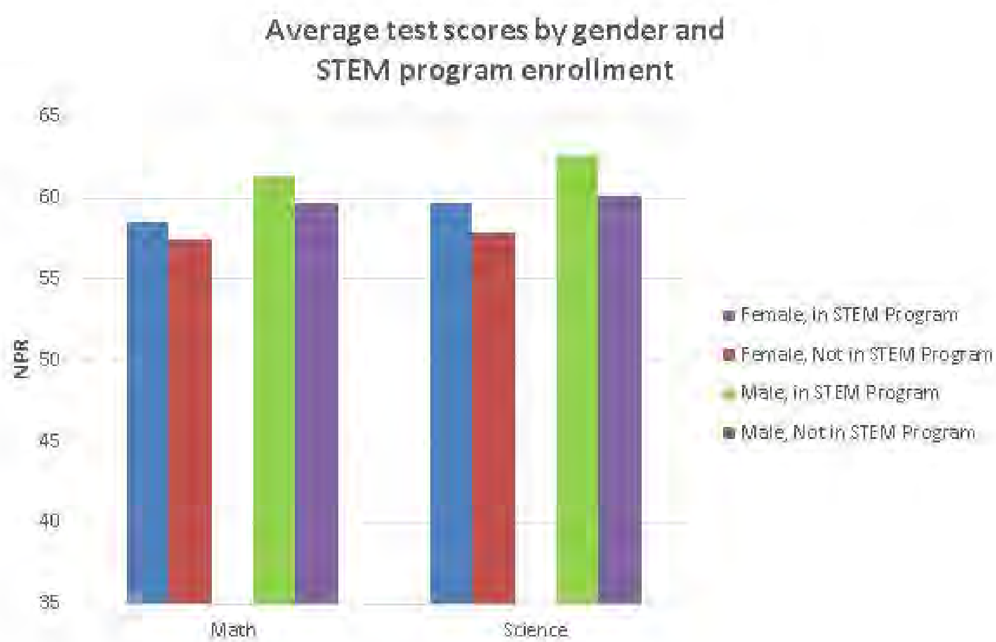
Updated June 2014

Interest in a STEM career is higher for minority students not in a STEM program vs. those who are in a STEM program. Whereas for white students the interest in STEM career is about the same for those in STEM program and those who are not.



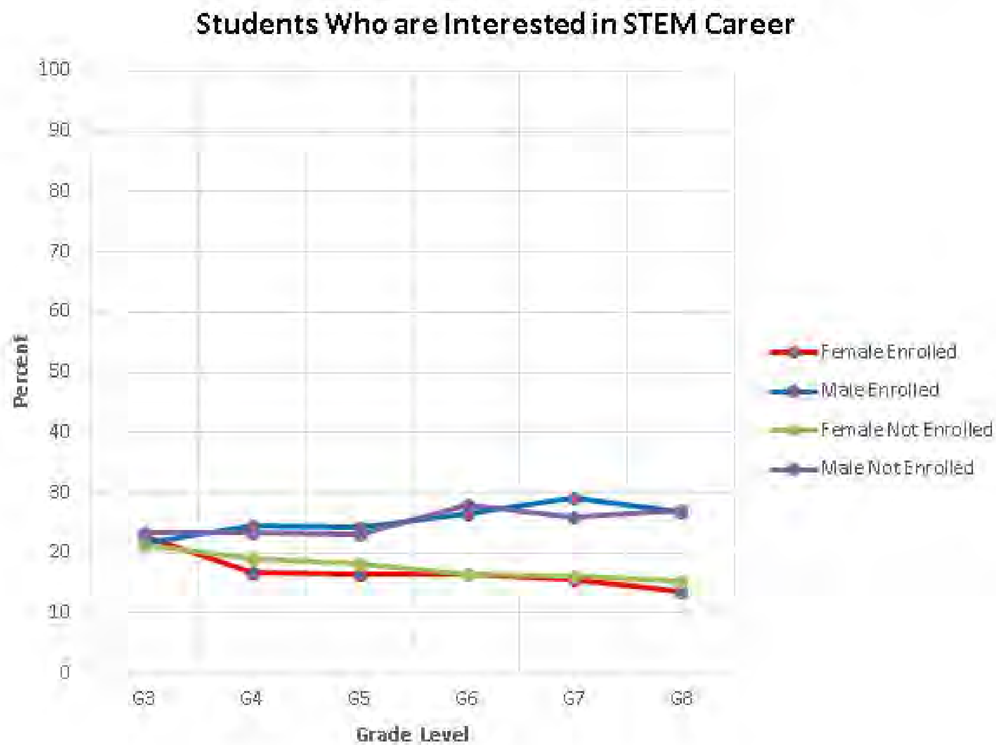
Updated June 2014

Average test scores are slightly higher for both males and females who participated in a STEM program. However, last year's results showed females who participated in a STEM program outperformed males who did not, but that is not the case this year.



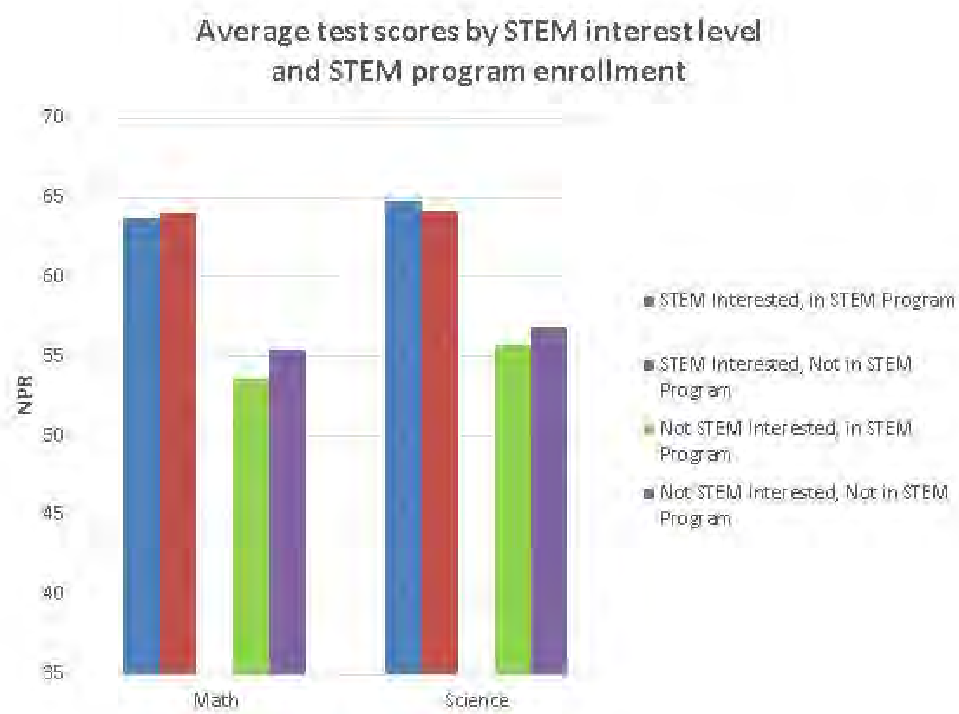
Updated June 2014

The percentage of female students who are interested in STEM shows a slight decline regardless of whether they are in a STEM program. The percentage of male students who are interested in STEM shows a slight increase regardless of whether they are in STEM program.



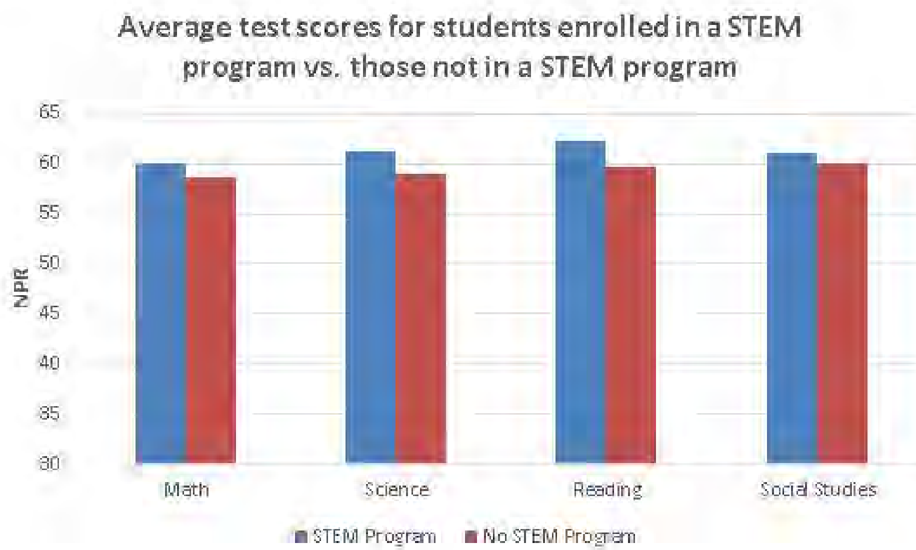
Updated June 2014

There is minimal difference in the effect of participating in a STEM program on test scores between those interested in STEM and those not interested in STEM.



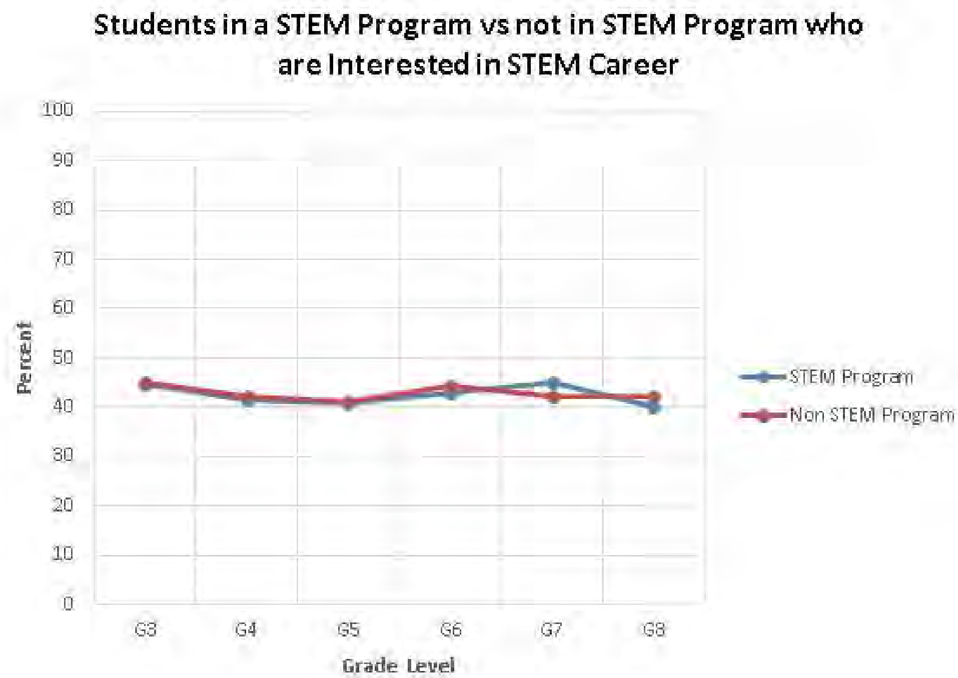
Updated June 2014

With more students now participating in STEM programs, the differences in average test scores between students in STEM programs and students not in STEM programs has diminished from last year.

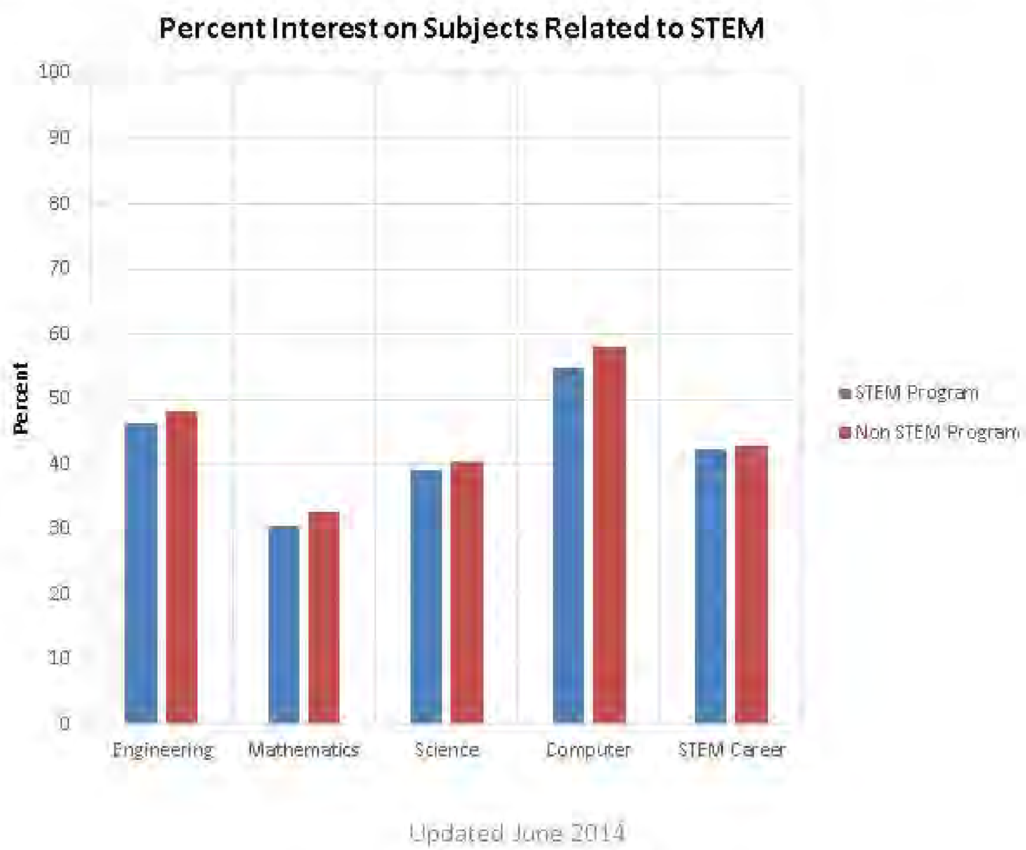


Updated June 2014

Across most grade levels, students in STEM program and those not in STEM program have about the same level of interest in STEM career.

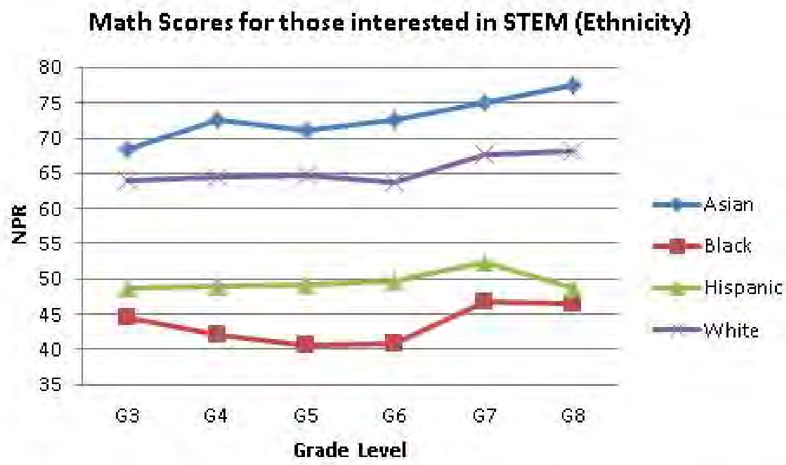


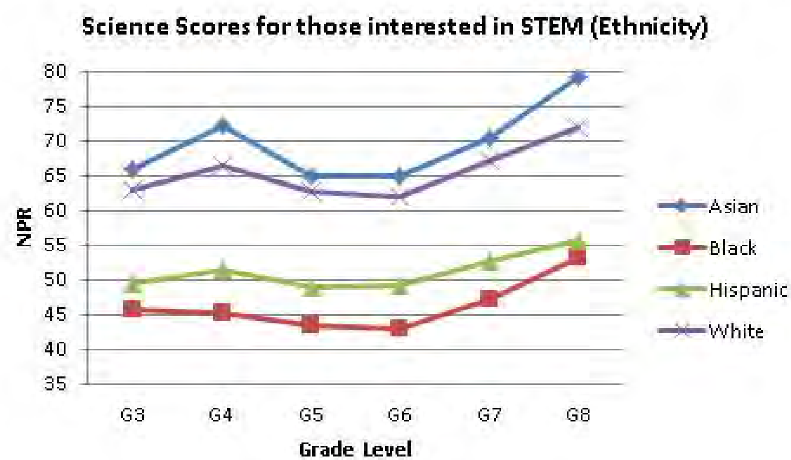
Students that are not in STEM program have a slightly higher interest in STEM related subjects and STEM career. However the difference is minimal with the largest difference of interest at only 3.4% in Computer & Technology. Computer & Technology has the highest percentage of students interested, whereas Mathematics garnered the lowest interest.



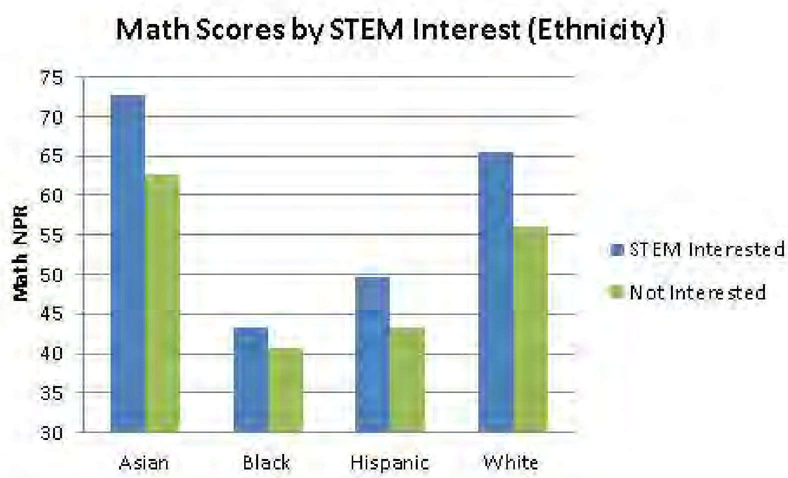
Measuring Impact of STEM program involvement

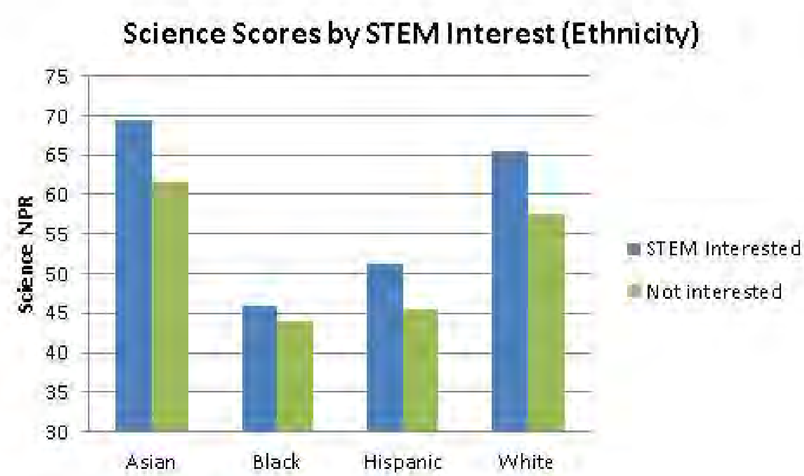
Updated June 2014





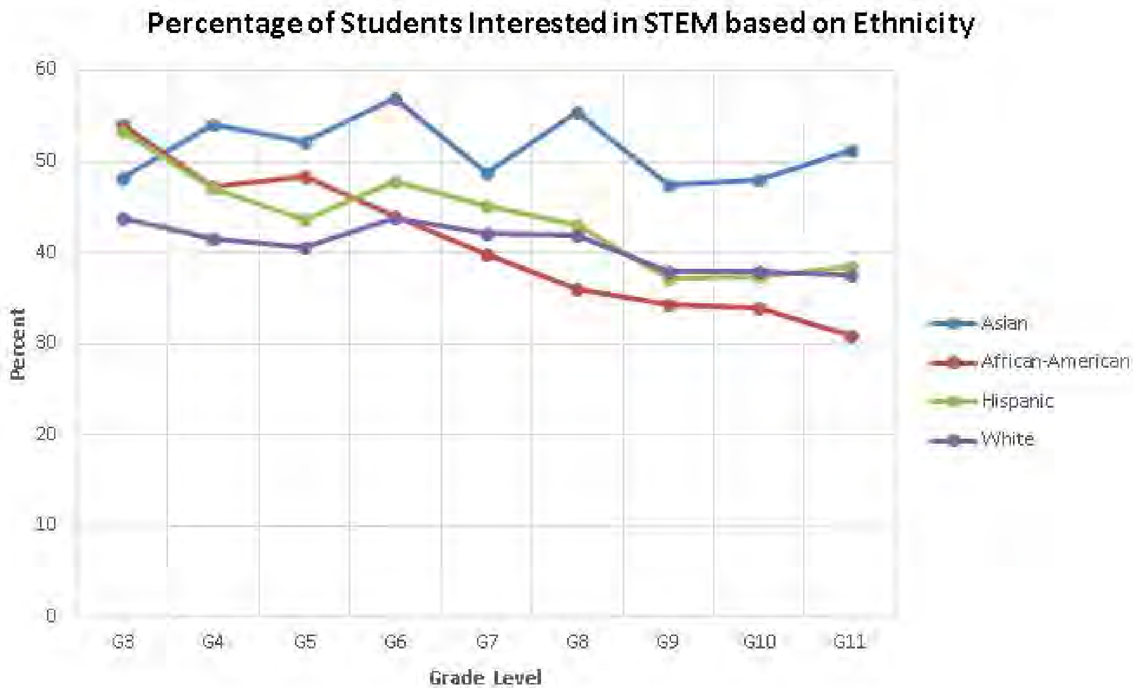
Updated June 2014



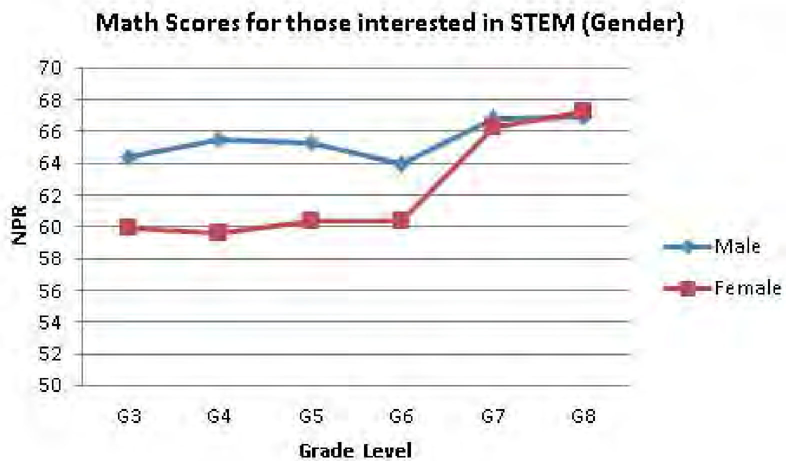


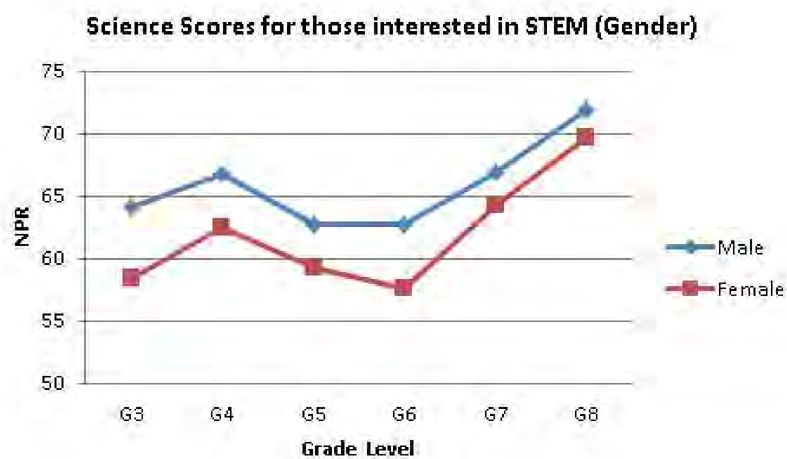
Updated June 2014

STEM interest declines for Hispanics and African – Americans, but it is at a steeper rate for African-Americans. STEM interest for Asians and Whites percent of interest remains steady on average.

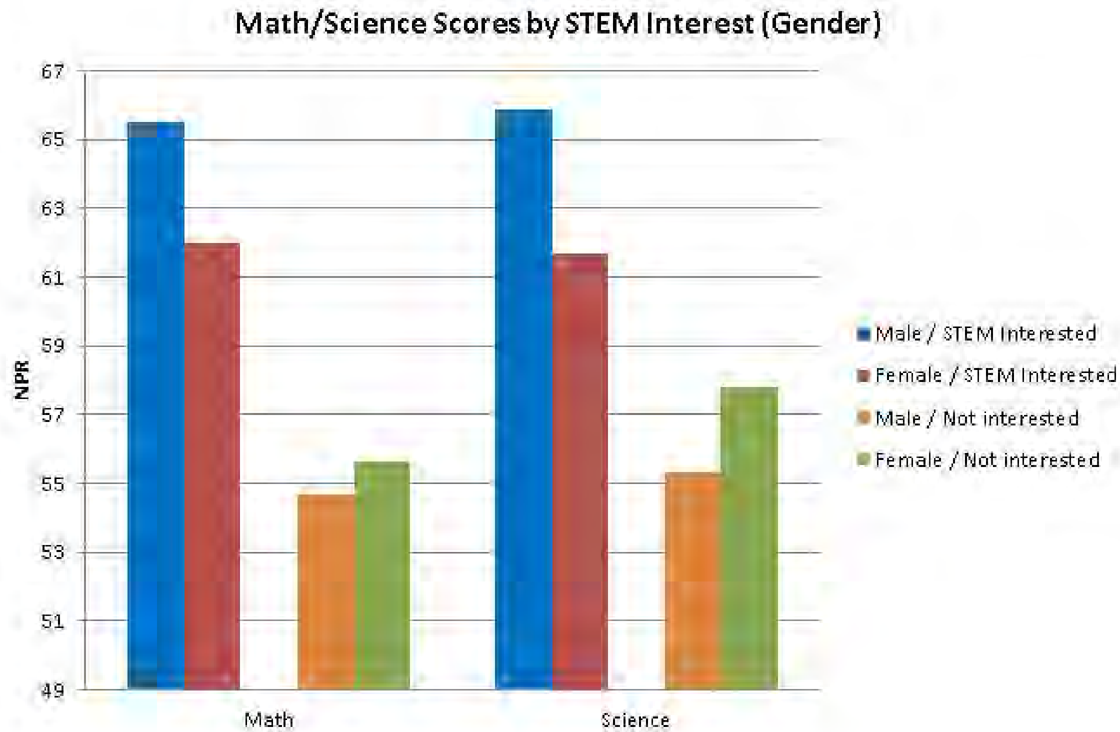


Updated June 2014


Math Scores for those interested in STEM (Gender)
70
68
66
64
62
60
58
56
54
52
50
NPR
G3
G4
G5
G6
G7
G8
Grade Level
Male
Female


Science Scores for those interested in STEM (Gender)
75
70
65
60
55
50
NPR
G3
G4
G5
G6
G7
G8
Grade Level
Male
Female

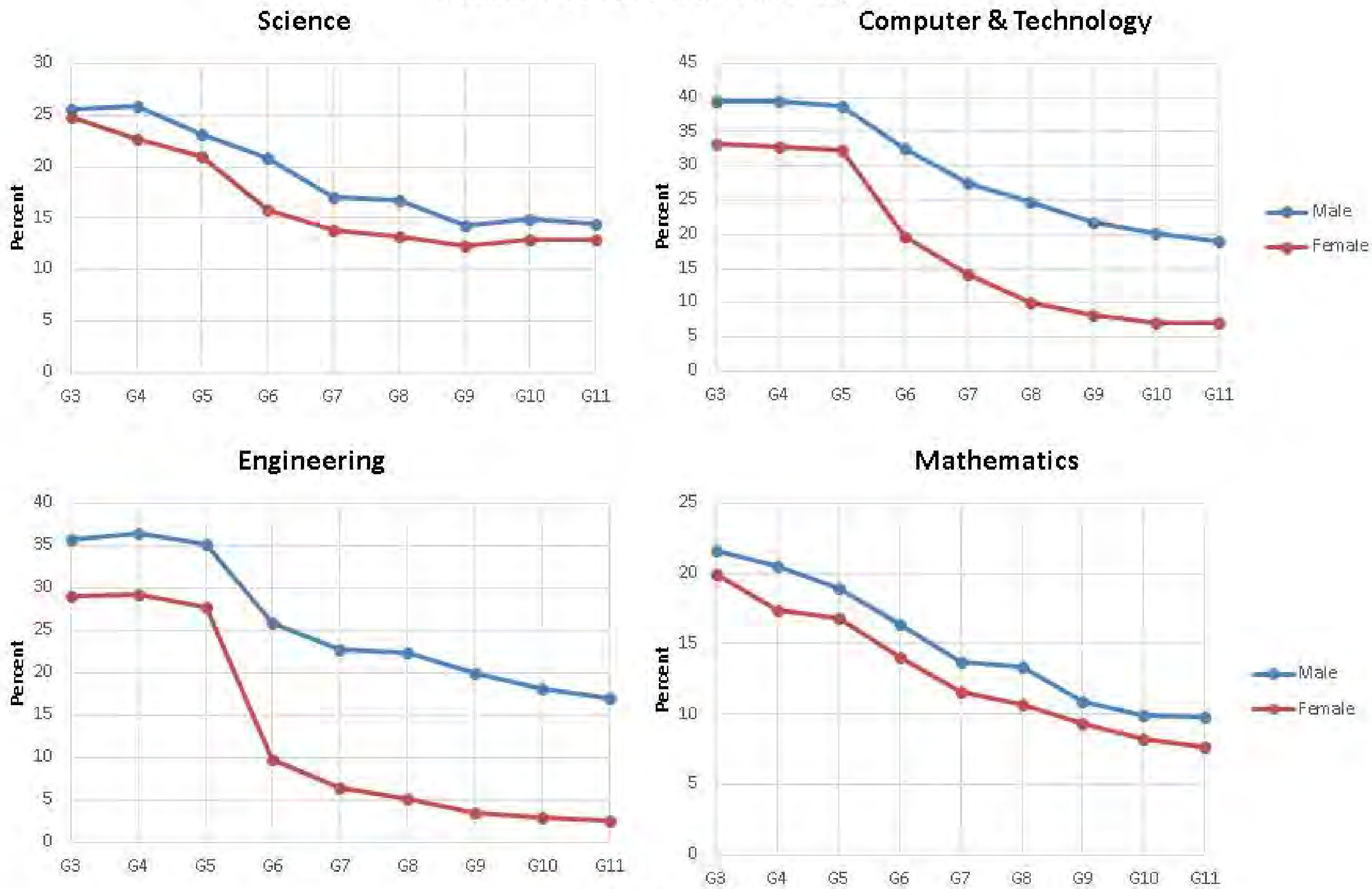
Male students interested in STEM continue to score higher on the Iowa Assessment Math and Science on average than female students interested in STEM. However, males not interested in STEM continue to score slightly lower on average than female students not interested in STEM.



Updated June 2014

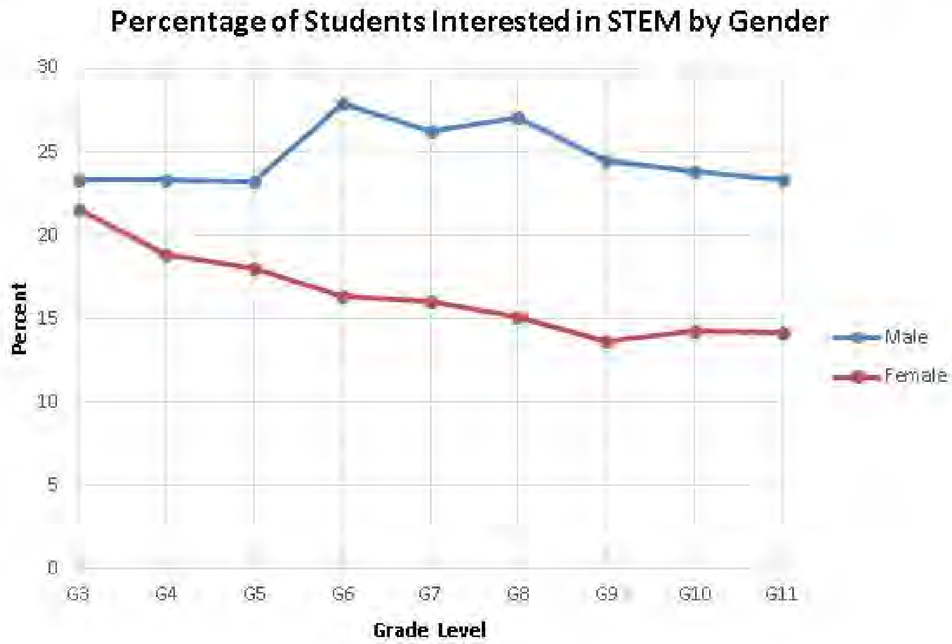
The pattern of interest remains the same as last year. Both male and female interest in the STEM subject areas mostly decline across grade levels. The gender interest gap widens considerably for Computers/Technology and Engineering.

Interest in STEM subject areas (Gender)



Updated June 2014

The pattern of interest remains the same as last year. Female interest in STEM has steady rate of decline. Male interest remains fairly stable and the highest interest happens from Grade 6 to 8. The biggest gap in interest, around 12%, happen in Grade 8.



Updated June 2014

Appendix B: SCED codes for selected STEM subjects

K12 STEM	Course Description	SCED Course Titles	Definition
Math	02056	Algebra II	Algebra II course topics typically include field properties and theorems; set theory; operations with rational and irrational expressions; factoring of rational expressions; in-depth study of linear equations and inequalities; quadratic equations; solving systems of linear and quadratic equations; graphing of constant, linear, and quadratic equations; properties of higher degree equations; and operations with rational and irrational exponents.
Math	02057	Algebra III	Algebra III courses review and extend algebraic concepts for students who have already taken Algebra II. Course topics include (but are not limited to) operations with rational and irrational expressions, factoring of rational expressions, linear equations and inequalities, quadratic equations, solving systems of linear and quadratic equations, properties of higher degree equations, and operations with rational and irrational exponents. The courses may introduce topics in discrete math, elementary probability and statistics; matrices and determinants; and sequences and series.
Math	02101	Number Theory	Number Theory courses review the properties and uses of integers and prime numbers, and extend this information to congruences and divisibility.
Math	02102	Discrete Mathematics	Discrete Mathematics courses include the study of topics such as number theory, discrete probability, set theory, symbolic logic, Boolean algebra, combinatorics, recursion, basic algebraic structures and graph theory.
Math	02103	Trigonometry	Trigonometry courses prepare students for eventual work in calculus and typically include the following topics: trigonometric and circular functions; their inverses and graphs; relations among the parts of a triangle; trigonometric identities and equations; solutions of right and oblique triangles; and complex numbers.
Math	02105	Trigonometry/Math Analysis	Covering topics of both Trigonometry and Math Analysis, these courses prepare students for eventual work in calculus. Topics typically include the study of right trigonometric and circular functions, inverses, and graphs; trigonometric identities and equations; solutions of right and oblique triangles; complex numbers; numerical tables; polynomial, logarithmic, exponential, and rational functions and their graphs; vectors; set theory; Boolean algebra and symbolic logic; mathematical induction; matrix algebra; sequences and series; and limits and continuity.
Math	02106	Trigonometry/Algebra	Trigonometry/Algebra courses combine trigonometry and advanced algebra topics, and are usually intended for students who have attained Algebra I and Geometry objectives. Topics typically include right trigonometric and circular functions, inverses, and graphs; trigonometric identities and equations; solutions of right and oblique triangles; complex numbers; numerical tables; field properties and theorems; set theory; operations with rational and irrational expressions; factoring of rational expressions; in-depth study of linear equations and inequalities; quadratic equations; solving systems of linear and quadratic equations; graphing of constant, linear, and quadratic equations; and properties of higher degree equations.
Math	02107	Trigonometry/Analytic Geometry	Covering topics of both Trigonometry and Analytic Geometry, these courses prepare students for eventual work in calculus. Topics typically include the study of right trigonometric and circular functions, inverses, and graphs; trigonometric identities and equations; solutions of right and oblique triangles; complex numbers; numerical tables; vectors; the polar coordinate system; equations and graphs of conic sections; rotations and transformations; and parametric equations.

K12 STEM	Course Description	SCED Course Titles	Definition
Math	02110	Pre-Calculus	Pre-Calculus courses combine the study of Trigonometry, Elementary Functions, Analytic Geometry, and Math Analysis topics as preparation for calculus. Topics typically include the study of complex numbers; polynomial, logarithmic, exponential, rational, right trigonometric, and circular functions, and their relations, inverses and graphs; trigonometric identities and equations; solutions of right and oblique triangles; vectors; the polar coordinate system; conic sections; Boolean algebra and symbolic logic; mathematical induction; matrix algebra; sequences and series; and limits and continuity.
Math	02121	Calculus	Calculus courses include the study of derivatives, differentiation, integration, the definite and indefinite integral, and applications of calculus. Typically, students have previously attained knowledge of pre-calculus topics (some combination of trigonometry, elementary functions, analytic geometry, and math analysis).
Math	02122	Multivariate Calculus	Multivariate Calculus courses include the study of hyperbolic functions, improper integrals, directional directives, and multiple integration and its applications.
Math	02123	Differential Calculus	Differential Calculus courses include the study of elementary differential equations including first- and higher-order differential equations, partial differential equations, linear equations, systems of linear equations, transformations, series solutions, numerical methods, boundary value problems, and existence theorems.
Math	02124	AP Calculus AB	Following the College Board's suggested curriculum designed to parallel college-level calculus courses, AP Calculus AB provides students with an intuitive understanding of the concepts of calculus and experience with its methods and applications. These courses introduce calculus and include the following topics: elementary functions; properties of functions and their graphs; limits and continuity; differential calculus (including definition of the derivative, derivative formulas, theorems about derivatives, geometric applications, optimization problems, and rate-of-change problems); and integral calculus (including antiderivatives and the definite integral).
Math	02125	AP Calculus BC	Following the College Board's suggested curriculum designed to parallel college-level calculus courses, AP Calculus BC courses provide students with an intuitive understanding of the concepts of calculus and experience with its methods and applications, and also require additional knowledge of the theoretical tools of calculus. These courses assume a thorough knowledge of elementary functions, and cover all of the calculus topics in AP Calculus AB as well as the following topics: vector functions, parametric equations, and polar coordinates; rigorous definitions of finite and nonexistent limits; derivatives of vector functions and parametrically defined functions; advanced techniques of integration and advanced applications of the definite integral; and sequences and series.
Math	02201	Probability and Statistics	Probability and Statistics courses introduce the study of likely events and the analysis, interpretation, and presentation of quantitative data. Course topics generally include basic probability and statistics: discrete probability theory, odds and probabilities, probability trees, populations and samples, frequency tables, measures of central tendency, and presentation of data (including graphs). Course topics may also include normal distribution and measures of variability.
Math	02202	Inferential Probability and Statistics	Probability and Statistics courses focus on descriptive statistics, with an introduction to inferential statistics. Topics typically include event probability, normal probability distribution, collection and description of data, frequency tables and graphs, measures of central tendency and variability, random variables, and random sampling. Course topics may also include covariance and correlation, central limit theorem, confidence intervals, and hypothesis testing.

K12 STEM	Course Description	SCED Course Titles	Definition
Math	02203	AP Statistics	Following the College Board's suggested curriculum designed to parallel college-level statistics courses, AP Statistics courses introduce students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. Students are exposed to four broad conceptual themes: exploring data, sampling and experimentation, anticipating patterns, and statistical inference.
Science	03101	Chemistry	Chemistry courses involve studying the composition, properties, and reactions of substances. These courses typically explore such concepts as the behaviors of solids, liquids, and gases; acid/base and oxidation/reduction reactions; and atomic structure. Chemical formulas and equations and nuclear reactions are also studied.
Science	03151	Physics	Physics courses involve the study of the forces and laws of nature affecting matter, such as equilibrium, motion, momentum, and the relationships between matter and energy. The study of physics includes examination of sound, light, and magnetic and electric phenomena.
Science	03001	Earth Science	Earth Science courses offer insight into the environment on earth and the earth’s environment in space. While presenting the concepts and principles essential to students’ understanding of the dynamics and history of the earth, these courses usually explore oceanography, geology, astronomy, meteorology, and geography.
Science	03002	Geology	Geology courses provide an in-depth study of the forces that formed and continue to affect the earth’s surface. Earthquakes, volcanoes, and erosion are examples of topics that are presented.
Science	03003	Environmental Science	Environmental Science courses examine the mutual relationships between organisms and their environment. In studying the interrelationships among plants, animals, and humans, these courses usually cover the following subjects: photosynthesis, recycling and regeneration, ecosystems, population and growth studies, pollution, and conservation of natural resources.
Science	03004	Astronomy	Astronomy courses offer students the opportunity to study the solar system, stars, galaxies, and interstellar bodies. These courses usually introduce and use astronomic instruments and typically explore theories regarding the origin and evolution of the universe, space, and time.
Science	03005	Marine Science	Courses in Marine Science focus on the content, features, and possibilities of the earth’s oceans. They explore marine organisms, conditions, and ecology and sometimes cover marine mining, farming, and exploration.
Science	03006	Meteorology	Meteorology courses examine the properties of the earth’s atmosphere. Topics usually include atmospheric layering, changing pressures, winds, water vapor, air masses, fronts, temperature changes and weather forecasting.
Science	03007	Physical Geography	Physical Geography courses equip students with an understanding of the constraints and possibilities that the physical environment places on human development. These courses include discussion of the physical landscape through geomorphology and topography, the patterns and processes of climate and weather, and natural resources.
Science	03008	Earth and Space Science	Earth and Space Science courses introduce students to the study of the earth from a local and global perspective. In these courses, students typically learn about time zones, latitude and longitude, atmosphere, weather, climate, matter, and energy transfer. Advanced topics often include the study of the use of remote sensing, computer visualization, and computer modeling to enable earth scientists to understand earth as a complex and changing planet.
Science	03052	Biology—Advanced Studies	Usually taken after a comprehensive initial study of biology, Biology—Advanced Studies courses cover biological systems in more detail. Topics that may be explored include cell organization, function, and reproduction; energy transformation; human anatomy and physiology; and the evolution and adaptation of organisms.

K12 STEM	Course Description	SCED Course Titles	Definition
Science	03053	Anatomy and Physiology	Usually taken after a comprehensive initial study of biology, Anatomy and Physiology courses present the human body and biological systems in more detail. In order to understand the structure of the human body and its functions, students learn anatomical terminology, study cells and tissues, explore functional systems (skeletal, muscular, circulatory, respiratory, digestive, reproductive, nervous, and so on), and may dissect mammals.
Science	03054	Anatomy	Anatomy courses present an in-depth study of the human body and biological system. Students study such topics as anatomical terminology, cells, and tissues and typically explore functional systems such as skeletal, muscular, circulatory, respiratory, digestive, reproductive, and nervous systems.
Science	03055	Physiology	Physiology courses examine all major systems, tissues, and muscle groups in the human body to help students understand how these systems interact and their role in maintaining homeostasis. These courses may also cover such topics as cell structure and function, metabolism, and the human life cycle.
Science	03056	AP Biology	Adhering to the curricula recommended by the College Board and designed to parallel college level introductory biology courses, AP Biology courses stress basic facts and their synthesis into major biological concepts and themes. These courses cover three general areas: molecules and cells (including biological chemistry and energy transformation); genetics and evolution; and organisms and populations (i.e., taxonomy, plants, animals, and ecology). AP Biology courses include college-level laboratory experiments.
Science	03057	IB Biology	IB Biology courses prepare students to take the International Baccalaureate Biology exams at either the Subsidiary or Higher level. In keeping with the general aim of IB Experimental Sciences courses, IB Biology promotes understanding of the facts, principles, and concepts underlying the biological field; critical analysis, evaluation, and generation of scientific information and hypotheses; improved ability to communicate scientific ideas; and an awareness of the impact of biology and scientific advances in biology upon both society and issues of ethical, philosophical, and political importance. Course content varies, but includes study of living organisms from the cellular level through functioning entities within the biosphere. Laboratory experimentation is an essential component of these courses.
Science	03059	Genetics	Genetics courses provide students with an understanding of general concepts concerning genes, heredity, and variation of organisms. Course topics typically include chromosomes, the structure of DNA and RNA molecules, and dominant and recessive inheritance and may also include lethal alleles, epistasis and hypostasis, and polygenic inheritance.
Science	03060	Microbiology	Microbiology courses provide students with a general understanding of microbes, prokaryotic and eukaryotic cells, and the three domain systems. Additional topics covered may include bacterial control, cell structure, fungi, protozoa, viruses and immunity, microbial genetics, and metabolism.
Science	03102	Chemistry—Advanced Studies	Usually taken after a comprehensive initial study of chemistry, Chemistry—Advanced Studies courses cover chemical properties and interactions in more detail. Advanced chemistry topics include organic chemistry, thermodynamics, electrochemistry, macromolecules, kinetic theory, and nuclear chemistry.
Science	03103	Organic Chemistry	Organic Chemistry courses involve the study of organic molecules and functional groups. Topics covered may include nomenclature, bonding molecular structure and reactivity, reaction mechanisms, and current spectroscopic techniques.
Science	03104	Physical Chemistry	Usually taken after completing a calculus course, Physical Chemistry courses cover chemical kinetics, quantum mechanics, molecular structure, molecular spectroscopy, and statistical mechanics.

K12 STEM	Course Description	SCED Course Titles	Definition
Science	03106	AP Chemistry	Following the curricula recommended by the College Board, AP Chemistry courses usually follow high school chemistry and second-year algebra. Topics covered may include atomic theory and structure; chemical bonding; nuclear chemistry; states of matter; and reactions (stoichiometry, equilibrium, kinetics, and thermodynamics). AP Chemistry laboratories are equivalent to those of typical college courses.
Science	03107	IB Chemistry	IB Chemistry courses prepare students to take the International Baccalaureate Chemistry exams at either the Subsidiary or Higher level. In keeping with the general aim of IB Experimental Sciences courses, IB Chemistry promotes understanding of the facts, patterns, and principles underlying the field of chemistry; critical analysis, evaluation, prediction, and generation of scientific information and hypotheses; improved ability to communicate scientific ideas; and an awareness of the impact of chemistry and scientific advances in chemistry upon both society and issues of ethical, philosophical, and political importance. Course content varies, but includes the study of the materials of the environment, their properties, and their interaction. Laboratory experimentation is an essential part of these courses.
Science	03152	Physics—Advanced Studies	Usually taken after a comprehensive initial study of physics, Physics—Advanced Studies courses provide instruction in laws of conservation, thermodynamics, and kinetics; wave and particle phenomena; electromagnetic fields; and fluid dynamics.
Science	03155	AP Physics B	AP Physics B courses are designed by the College Board to parallel college-level physics courses that provide a systematic introduction to the main principles of physics and emphasize problem solving without calculus. Course content includes mechanics, electricity and magnetism, modern physics, waves and optics, and kinetic theory and thermodynamics.
Science	03156	AP Physics C	Designed by the College Board to parallel college-level physics courses that serve as a partial foundation for science or engineering majors, AP Physics C courses primarily focus on 1) mechanics and 2) electricity and magnetism, with approximately equal emphasis on these two areas. AP Physics C courses are more intensive and analytical than AP Physics B courses and require the use of calculus to solve the problems posed.
Science	03157	IB Physics	IB Physics courses prepare students to take the International Baccalaureate Physics exams at either the Subsidiary or Higher level. In keeping with the general aim of IB Experimental Sciences courses, IB Physics promotes understanding of the facts, patterns, and principles underlying the field of physics; critical analysis, prediction, and application of scientific information and hypotheses; improved ability to communicate scientific ideas; and an awareness of the impact of scientific advances in physics upon both society and issues of ethical, philosophical, and political importance. Course content varies, but includes the study of the fundamental laws of nature and the interaction between concepts of matter, fields, waves, and energy. Laboratory experimentation is essential; calculus may be used in some courses.
Science	03160	IB Physical Science	IB Physical Science courses prepare students to take the International Baccalaureate Physical Science exams at either the Subsidiary or Higher level. These courses integrate the study of physics and chemistry, showing how the physical and chemical properties of materials can be explained and predicted in terms of atomic, molecular, and crystal structures and forces. In keeping with the general aim of IB Experimental Sciences courses, IB Physical Science courses promote critical analysis, prediction, and application of scientific information and hypotheses; improved ability to communicate scientific ideas; and an awareness of the impact of science and scientific advances upon both society and issues of ethical, philosophical, and political importance. Students are required to develop and pursue an individual, experimental project, which is evaluated as part of the IB exam.

K12 STEM	Course Description	SCED Course Titles	Definition
Science	03203	Applied Biology/Chemistry	Applied Biology/Chemistry courses integrate biology and chemistry into a unified domain of study and present the resulting body of knowledge in the context of work, home, society, and the environment, emphasizing field and laboratory activities. Topics include natural resources, water, air and other gases, nutrition, disease and wellness, plant growth and reproduction, life processes, microorganisms, synthetic materials, waste and waste management, and the community of life.
Science	03207	AP Environmental Science	AP Environmental Science courses are designed by the College Board to provide students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, identify and analyze environmental problems (both natural and human made), evaluate the relative risks associated with the problems, and examine alternative solutions for resolving and/or preventing them. Topics covered include science as a process, ecological processes and energy conversions, earth as an interconnected system, the impact of humans on natural systems, cultural and societal contexts of environmental problems, and the development of practices that will ensure sustainable systems.
Science	03208	IB Environmental Science	IB Environmental Systems courses prepare students to take the International Baccalaureate Environmental Systems exam at the Standard level by providing them with the knowledge, methods, and techniques to understand the nature and functioning of natural systems, the relationships that affect environmental equilibrium, and human impact on the biosphere. Topics also include ecosystem integrity and sustainability, students' own relationships to the environment, and the nature of internationalism in resolving major environmental issues.
Science	03209	Aerospace	Aerospace courses explore the connection between meteorology, astronomy, and flight across and around the earth as well as into outer space. In addition to principles of meteorology (e.g., atmosphere, pressures, winds and jet streams) and astronomical concepts (e.g., solar system, stars, and interplanetary bodies), course topics typically include the history of aviation, principles of aeronautical decision-making, airplane systems, aerodynamics, and flight theory.
Science	03212	Scientific Research and Design	In Scientific Research and Design courses, students conceive of, design, and complete a project using scientific inquiry and experimentation methodologies. Emphasis is typically placed on safety issues, research protocols, controlling or manipulating variables, data analysis, and a coherent display of the project and its outcome(s).
Technology	10007	IB Information Technology in a Global Society	IB Information Technology in a Global Society courses prepare students to take the International Baccalaureate Information Technology exams and examine the interaction among information, technology, and society. Course content is designed to help students develop a systematic, problem solving approach to processing and analyzing information using a range of information tools. In these courses, students also discuss and evaluate how modern information technology affects individuals, relationships among people, and institutions and societies.
Technology	10051	Information Management	Information Management courses provide students with the knowledge and skills to develop and implement a plan for an information system that meets the needs of business. Students develop an understanding of information system theory, skills in administering and managing information systems, and the ability to analyze and design information systems.
Technology	10052	Database Management and Data Warehousing	Database Management and Data Warehousing courses provide students with the skills necessary to design databases to meet user needs. Courses typically address how to enter, retrieve, and manipulate data into useful information. More advanced topics may cover implementing interactive applications for common transactions and the utility of mining data.

K12 STEM	Course Description	SCED Course Titles	Definition
Technology	10053	Database Applications	Database Application courses provide students with an understanding of database development, modeling, design, and normalization. These courses typically cover such topics as SELECT statements, data definition, manipulation, control languages, records, and tables. In these courses, students may use Oracle WebDB, SQL, PL/SQL, SPSS, and SAS and may prepare for certification.
Technology	10054	Data Systems/Processing	Data Systems/Processing courses introduce students to the uses and operation of computer hardware and software and to the programming languages used in business applications. Students typically use BASIC, COBOL, and/or RPL languages as they write flowcharts or computer programs and may also learn data-processing skills.
Technology	10101	Network Technology	Network Technology courses address the technology involved in the transmission of data between and among computers through data lines, telephone lines, or other transmission media (such as hard wiring, cable television networks, radio waves, and so on). These courses may emphasize the capabilities of networks, network technology itself, or both. Students typically learn about network capabilities—including electronic mail, public networks, and electronic bulletin boards—and network technology—including network software, hardware, and peripherals involved in setting up and maintaining a computer network.
Technology	10102	Networking Systems	Networking Systems courses are designed to provide students with the opportunity to understand and work with hubs, switches, and routers. Students develop an understanding of LAN (local area network), WAN (wide area network), wireless connectivity, and Internet-based communications with a strong emphasis on network function, design, and installation practices. Students acquire skills in the design, installation, maintenance, and management of network systems that may help them obtain network certification.
Technology	10103	Area Network Design and Protocols	Area Network Design and Protocols courses address the role of computers in a network system, the Open Systems Interconnection (OSI) model, structured wiring systems, and simple LAN (local area network) and WAN (wide area network) designs.
Technology	10104	Router Basics	Router Basics courses teach students about router components, start-up, and configuration using CISCO routers, switches, and the IOS (Internetwork Operation System). These courses also cover such topics as TCP/IP protocol, IP addressing, subnet masks, and network trouble-shooting.
Technology	10105	NetWare Routing	NetWare Routing courses introduce students to such topics as Virtual LANs (VLAN) and switched internetworking, comparing traditional shared local area network (LAN) configurations with switched LAN configurations, and they also discuss the benefits of using a switched VLAN architecture. These courses also may cover routing protocols like RIP, IGRP, Novell IPX, and Access Control Lists (ACLs).
Technology	10106	Wide Area Telecommunications and Networking	Wide Area Telecommunications and Networking courses provide students with the knowledge and skills to enable them to design Wide Area Networks (WANs) using ISDN, Frame-Relay, and PPP. Students gain knowledge and skills in network management and maintenance and develop expertise in trouble-shooting and assessing the adequacy of network configuration to meet changing conditions.
Technology	10107	Wireless Networks	Wireless Networks courses focus on the design, planning, implementation, operation, and trouble-shooting of wireless computer networks. These courses typically include a comprehensive overview of best practices in technology, security, and design, with particular emphasis on hands-on skills in (1) wireless LAN set-up and trouble-shooting; (2) 802.11a & 802.11b technologies, products, and solutions; (3) site surveys; (4) resilient WLAN design, installation, and configuration; (5) vendor interoperability strategies; and (6) wireless bridging.

K12 STEM	Course Description	SCED Course Titles	Definition
Technology	10108	Network Security	Network Security courses teach students how to design and implement security measures in order to reduce the risk of data vulnerability and loss. Course content usually includes typical security policies; firewall design, installation, and management; secure router design, configuration, and maintenance; and security-specific technologies, products, and solutions.
Technology	10109	Essentials of Network Operating Systems	Essentials of Network Operating Systems courses provide a study of multi-user, multi-tasking network operating systems. In these courses, students learn the characteristics of the Linux, Windows 2000, NT, and XP network operating systems and explore a variety of topics including installation procedures, security issues, back-up procedures, and remote access.
Technology	10110	Microsoft Certified Professional (MCP)	Microsoft Certified Professional courses provide students with the knowledge and skills necessary to be employed as a network administrator in the latest Windows server-networking environment. Topics include installing, configuring, and trouble-shooting the Windows server. These courses prepare students to set up network connections; manage security issues and shares; and develop policies. Students are typically encouraged to take the MCP exam.
Technology	10152	Computer Programming	Computer Programming courses provide students with the knowledge and skills necessary to construct computer programs in one or more languages. Computer coding and program structure are often introduced with the BASIC language, but other computer languages, such as Visual Basic (VB), Java, Pascal, C++, and COBOL, may be used instead. Initially, students learn to structure, create, document, and debug computer programs, and as they progress, more emphasis is placed on design, style, clarity, and efficiency. Students may apply the skills they learn to relevant applications such as modeling, data management, graphics, and text-processing.
Technology	10153	Visual Basic (VB) Programming	Visual Basic (VB) Programming courses provide an opportunity for students to gain expertise in computer programs using the Visual Basic (VB) language. As with more general computer programming courses, the emphasis is on how to structure and document computer programs and how to use problem-solving techniques. These courses cover such topics as the use of text boxes, scroll bars, menus, buttons, and Windows applications. More advanced topics may include mathematical and business functions and graphics.
Technology	10154	C++ Programming	C++ Programming courses provide an opportunity for students to gain expertise in computer programs using the C++ language. As with more general computer programming courses, the emphasis is on how to write logically structured programs, include appropriate documentation, and use problem solving techniques. More advanced topics may include multi-dimensional arrays, functions, and records.
Technology	10155	Java Programming	Java Programming courses provide students with the opportunity to gain expertise in computer programs using the Java language. As with more general computer programming courses, the emphasis is on how to structure and document computer programs, using problem-solving techniques. Topics covered in the course include syntax, I/O classes, string manipulation, and recursion.
Technology	10156	Computer Programming—Other Language	Computer Programming—Other Language courses provide students with the opportunity to gain expertise in computer programs using languages other than those specified (such as Pascal, FORTRAN, or emerging languages). As with other computer programming courses, the emphasis is on how to structure and document computer programs, using problem-solving techniques. As students advance, they learn to capitalize on the features and strengths of the language being used.

K12 STEM	Course Description	SCED Course Titles	Definition
Technology	10157	AP Computer Science A	Following the College Board’s suggested curriculum designed to mirror college-level computer science courses, AP Computer Science A courses provide students with the logical, mathematical, and problem-solving skills needed to design structured, well-documented computer programs that provide solutions to real-world problems. These courses cover such topics as programming methodology, features, and procedures; algorithms; data structures; computer systems; and programmer responsibilities.
Technology	10158	AP Computer Science AB	Following the College Board’s suggested curriculum designed to mirror college-level computer science courses, AP Computer Science AB courses (in addition to covering topics included in AP Computer Science A) provide a more formal and extensive study of program design, algorithms, data structures, and execution costs.
Technology	10159	IB Computing Studies	IB Computer Studies courses prepare students to take the International Baccalaureate Computing Studies exam at either the Subsidiary or Higher level. The courses emphasize problem analysis, efficient use of data structures and manipulation procedures, and logical decision-making. IB Computing Studies courses also cover the applications and effects of the computer on modern society as well as the limitations of computer technology.
Technology	10201	Web Page Design	Web Page Design courses teach students how to design web sites by introducing them to and refining their knowledge of site planning, page layout, graphic design, and the use of markup languages—such as Extensible Hypertext Markup, JavaScript, Dynamic HTML, and Document Object Model—to develop and maintain a web page. These courses may also cover security and privacy issues, copyright infringement, trademarks, and other legal issues relating to the use of the Internet. Advanced topics may include the use of forms and scripts for database access, transfer methods, and networking fundamentals.
Technology	10202	Computer Graphics	Computer Graphics courses provide students with the opportunity to explore the capability of the computer to produce visual imagery and to apply graphic techniques to various fields, such as advertising, TV/video, and architecture. Typical course topics include modeling, simulation, animation, and image retouching.
Technology	10203	Interactive Media	Interactive Media courses provide students with the knowledge and skills to create, design, and produce interactive media products and services. The courses may emphasize the development of digitally generated and/or computer-enhanced media. Course topics may include 3D animation, graphic media, web development, and virtual reality. Upon completion of these courses, students may be prepared for industry certification.
Technology	10251	Computer Technology	Computer Technology courses introduce students to the features, functions, and design of computer hardware and provide instruction in the maintenance and repair of computer components and peripheral devices.
Technology	10252	Computer Maintenance	Computer Maintenance courses prepare students to apply basic electronic theory and principles in diagnosing and repairing personal computers and input/output devices. Topics may include operating, installing, maintaining, and repairing computers, network systems, digital control instruments, programmable controllers, and related robotics.
Technology	10253	Information Support and Services	Information Support and Services courses prepare students to assist users of personal computers by diagnosing their problems in using application software packages and maintaining security requirements.

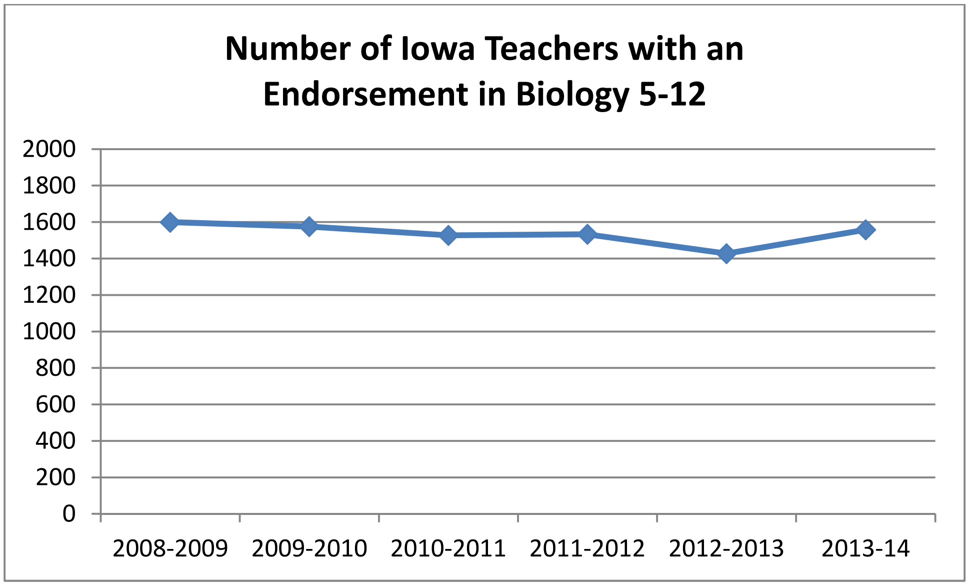
K12 STEM	Course Description	SCED Course Titles	Definition
Technology	10254	IT Essentials: PC Hardware and Software	IT Essentials: PC Hardware and Software courses provide students with in-depth exposure to computer hardware and operating systems. Course topics include the functionality of hardware and software components as well as suggested best practices in maintenance and safety issues. Students learn to assemble and configure a computer, install operating systems and software, and troubleshoot hardware and software problems. In addition, these courses introduce students to networking and often prepare them for industry certification.
Technology	10255	CISCO—The Panduit Network Infrastructure Essentials (PNIE)	CISCO—PNIE courses provide students with the knowledge to create innovative network infrastructure solutions. These courses offer students basic cable installer information and help them acquire the skills to build and use the physical layer of network infrastructure and develop a deeper understanding of networking devices.
Engineering	21002	Engineering Applications	Engineering Applications courses provide students with an overview of the practical uses of a variety of engineering applications. Topics covered usually include hydraulics, pneumatics, computer interfacing, robotics, computer-aided design, computer numerical control, and electronics.
Engineering	21003	Engineering Technology	Engineering Technology courses provide students with the opportunity to focus on one or more areas of industrial technology. Students apply technological processes to solve real engineering problems; develop the knowledge and skills to design, modify, use, and apply technology; and may also design and build prototypes and working models. Topics covered in the course include the nature of technology, use of technology, and design processes.
Engineering	21004	Principles of Engineering	Principles of Engineering courses provide students with an understanding of the engineering/technology field. Students typically explore how engineers use various technology systems and manufacturing processes to solve problems; they may also gain an appreciation of the social and political consequences of technological change.
Engineering	21005	Engineering—Comprehensive	Engineering—Comprehensive courses introduce students to and expand their knowledge of major engineering concepts such as modeling, systems, design, optimization, technology-society interaction, and ethics. Particular topics often include applied engineering graphic systems, communicating technical information, engineering design principles, material science, research and development processes, and manufacturing techniques and systems. The courses may also cover the opportunities and challenges in various branches of engineering.
Engineering	21006	Engineering Design	Engineering Design courses offer students experience in solving problems by applying a design development process. Often using solid modeling computer design software, students develop, analyze, and test product solutions models as well as communicate the features of those models.
Engineering	21007	Engineering Design and Development	Engineering Design and Development courses provide students with the opportunity to apply engineering research principles as they design and construct a solution to an engineering problem. Students typically develop and test solutions using computer simulations or models but eventually create a working prototype as part of the design solution.
Engineering	21008	Digital Electronics	Digital Electronics courses teach students how to use applied logic in the development of electronic circuits and devices. Students may use computer simulation software to design and test digital circuitry prior to the actual construction of circuits and devices.
Engineering	21009	Robotics	Robotics courses develop and expand students’ skills and knowledge so that they can design and develop robotic devices. Topics covered in the course may include mechanics, electrical and motor controls, pneumatics, computer basics, and programmable logic controllers.

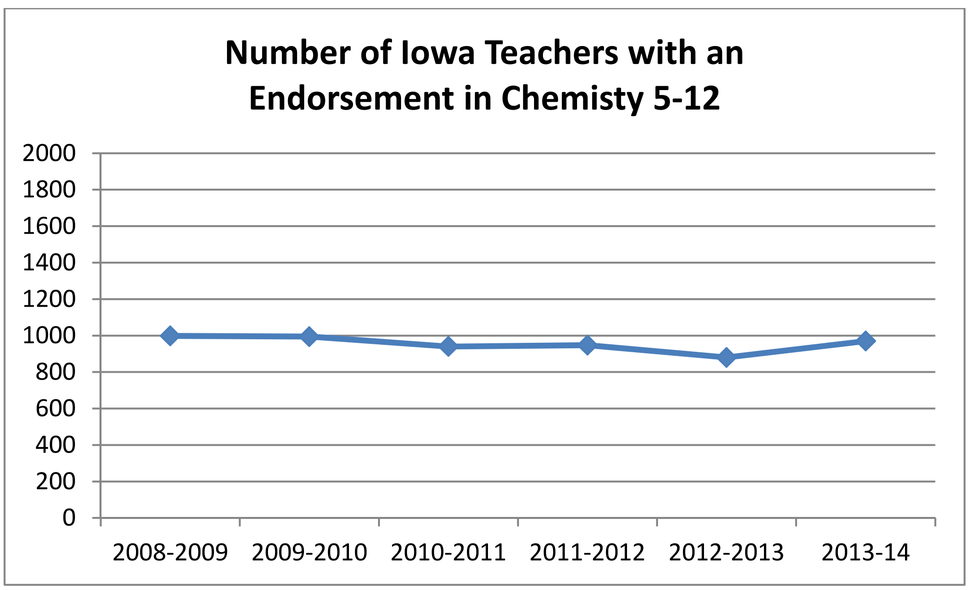
K12 STEM	Course Description	SCED Course Titles	Definition
Engineering	21010	Computer Integrated Manufacturing	Computer Integrated Manufacturing courses involve the study of robotics and automation. Building on computer solid modeling skills, students may use computer numerical control (CNC) equipment to produce actual models of their three-dimensional designs. Course topics may also include fundamental concepts of robotics, automated manufacturing, and design analysis.
Engineering	21011	Civil Engineering	Civil Engineering courses expose students to the concepts and skills used by urban planners, developers, and builders. Students may be trained in soil sampling and analysis, topography and surveying, and drafting or blueprint-reading. Additional course topics may include traffic analysis, geologic principles, and urban design.
Engineering	21012	Civil Engineering and Architecture	Civil Engineering and Architecture courses provide students with an overview of the fields of Civil Engineering and Architecture while emphasizing the interrelationship of both fields. Students typically use software to address real world problems and to communicate the solutions that they develop. Course topics typically include the roles of civil engineers and architects, project-planning, site-planning, building design, project documentation, and presentation.
Engineering	21013	Aerospace Engineering	Aerospace Engineering courses introduce students to the world of aeronautics, flight, and engineering. Topics covered in the course may include the history of flight, aerodynamics and aerodynamics testing, flight systems, astronautics, space life systems, aerospace materials, and systems engineering.
Engineering	21014	Biotechnical Engineering	Biotechnical Engineering courses enable students to develop and expand their knowledge and skills in biology, physics, technology, and mathematics. Course content may vary widely, drawing upon diverse fields such as biomedical engineering, biomolecular genetics, bioprocess engineering, agricultural biology, or environmental engineering. Students may engage in problems related to biomechanics, cardiovascular engineering, genetic engineering, agricultural biotechnology, tissue engineering, biomedical devices, human interfaces, bioprocesses, forensics, and bioethics.
Engineering	21051	Technological Literacy	Technological Literacy courses expose students to the communication, transportation, energy, production, biotechnology, and integrated technology systems and processes that affect their lives. The study of these processes enables students to better understand technological systems and their applications and uses.
Engineering	21052	Technological Processes	Technological Processes courses provide students with the opportunity to focus on one or more areas of industrial technology, applying technological processes to solve real problems and developing the knowledge and skills to design, modify, use, and apply technology appropriately. Students may examine case studies, explore simulations, or design and build prototypes and working models.
Engineering	21053	Emerging Technologies	Emerging Technologies courses emphasize students’ exposure to and understanding of new and emerging technologies. The range of technological issues varies widely but typically include lasers, fiber options, electronics, robotics, computer technologies, CAD/CAM, communication modalities, and transportation technologies.
Engineering	21054	Technology Innovation and Assessment	Technology Innovation and Assessment courses use engineering design activities to help students understand how criteria, constraints, and processes affect design solutions and provide students with the skills to systematically assess technological developments or solutions. Course topics may include brainstorming, visualizing, modeling, simulating, constructing, testing, and refining designs.
Engineering	21055	Aerospace Technology	Aerospace Technology courses introduce students to the technology systems used in the aerospace industry and their interrelationships. Examples of such systems include satellite communications systems, composite materials in airframe manufacturing, space station constructions techniques, space shuttle propulsion systems, aerostatics, and aerodynamics.

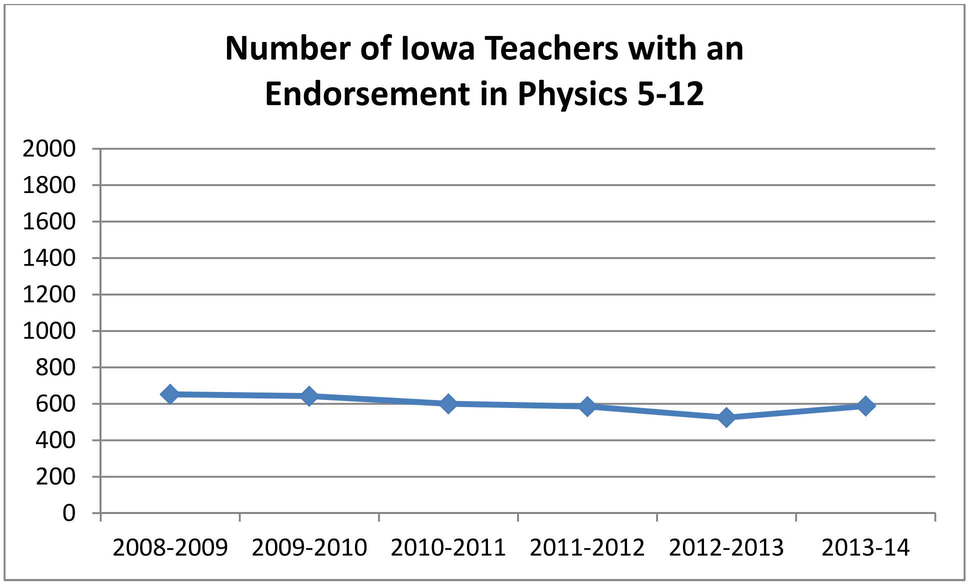
K12 STEM	Course Description	SCED Course Titles	Definition
HEALTH CARE	14251	Health Science	Health Science courses integrate chemistry, microbiology, chemical reactions, disease processes, growth and development, and genetics with anatomy and physiology of the body systems. Typically, these courses reinforce science, mathematics, communications, health, and social studies principles and relate them to health care.
HEALTH CARE	14252	Biotechnology	Biotechnology courses involve the study of the bioprocesses of organisms, cells, and/or their components and enable students to use this knowledge to produce or refine products, procedures, and techniques. Course topics typically include laboratory measurement, monitoring, and calculation; growth and reproduction; chemistry and biology of living systems; quantitative problem-solving; data acquisition and display; and ethics. Advanced topics may include elements of biochemistry, genetics, and protein purification techniques.
HEALTH CARE	14253	Pharmacology	Pharmacology courses involve a study of how living animals can be changed by chemical substances, especially by the actions of drugs and other substances used to treat disease. Basic concepts of physiology, pathology, biochemistry, and bacteriology are typically brought into play as students examine the effects of drugs and their mechanisms of action.

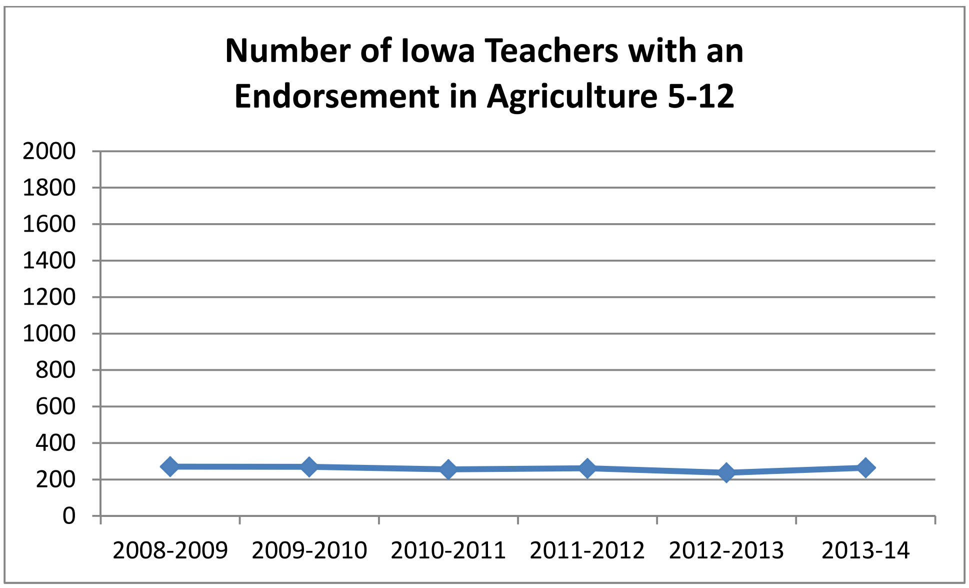
Appendix C: Additional representations of STEM-related endorsements (Indicator 10)

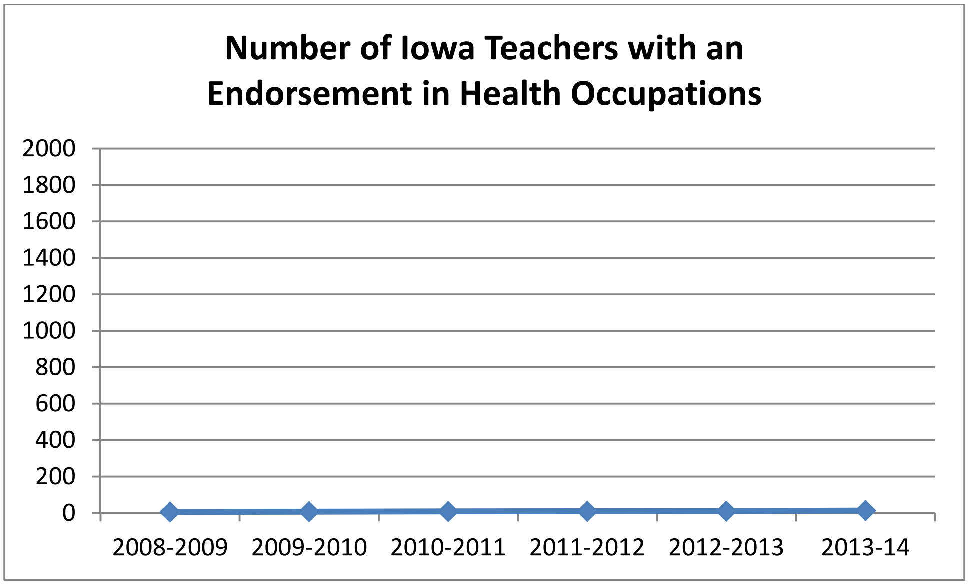
Data Source for All Figures: Basic Educational Data Survey (BEDS), Iowa Department of Education, May 2014

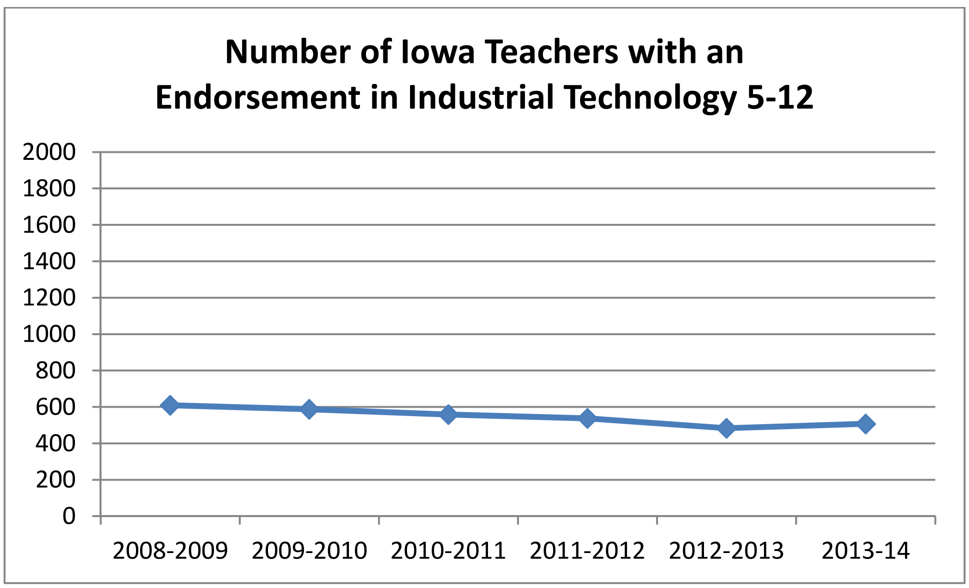





Number of Iowa Teachers with an Endorsement in Physics 5-12
2000
1800
1600
1400
1200
1000
800
600
400
200
0
2008-2009
2009-2010
2010-2011
2011-2012
2012-2013
2013-14

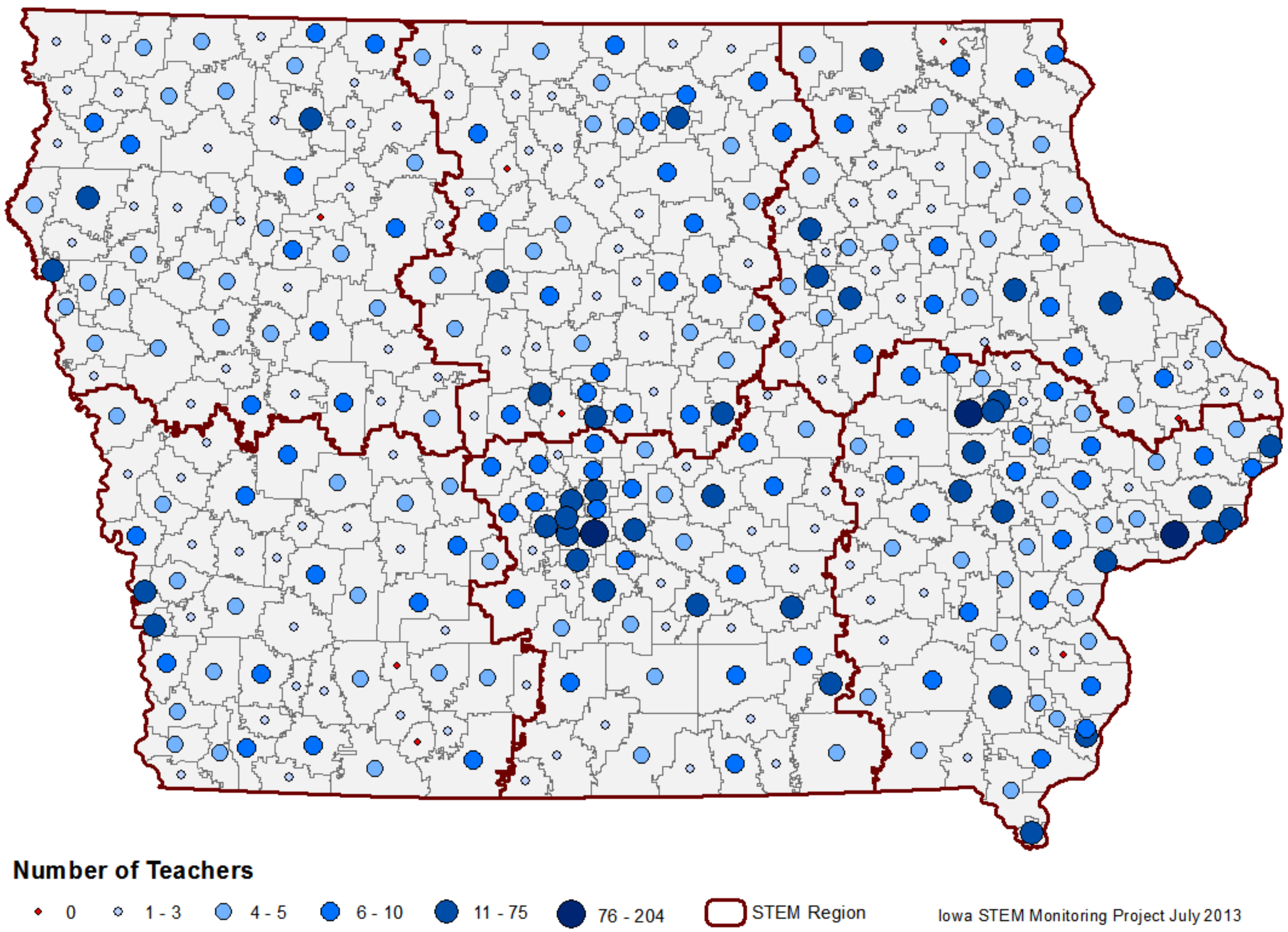

Number of Iowa Teachers with an Endorsement in Agriculture 5-12
2000
1800
1600
1400
1200
1000
800
600
400
200
0
2008-2009
2009-2010
2010-2011
2011-2012
2012-2013
2013-14

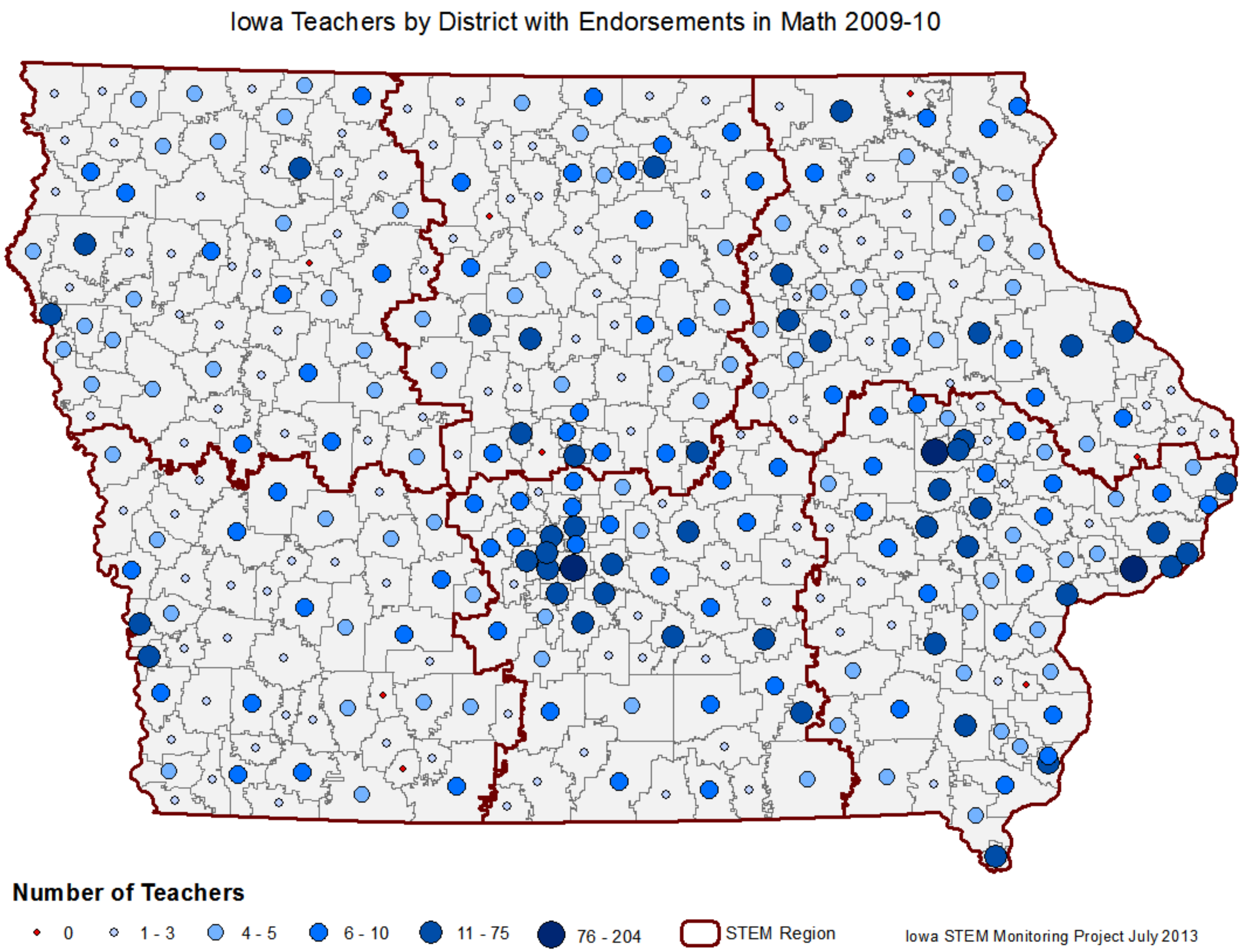

Number of Iowa Teachers with an Endorsement in Health Occupations
2000
1800
1600
1400
1200
1000
800
600
400
200
0
2008-2009
2009-2010
2010-2011
2011-2012
2012-2013
2013-14


Number of Iowa Teachers with an Endorsement in Industrial Technology 5-12
2000
1800
1600
1400
1200
1000
800
600
400
200
0
2008-2009
2009-2010
2010-2011
2011-2012
2012-2013
2013-14

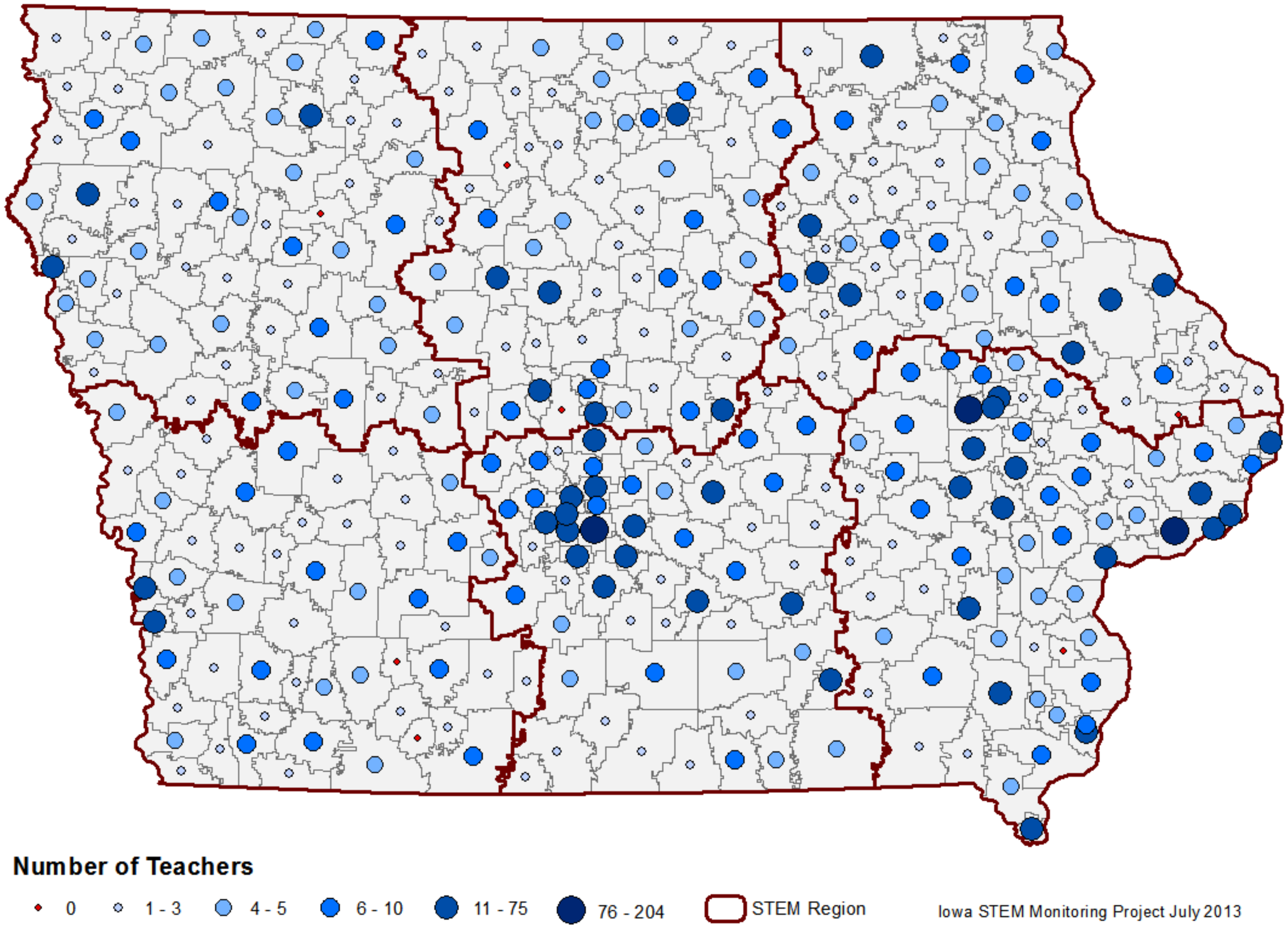
Appendix D: Distribution of Iowa teachers by district with endorsements in Math or Science, 2008-2013 (Indicator 10)

Iowa Teachers by District with Endorsements in Math 2008-09

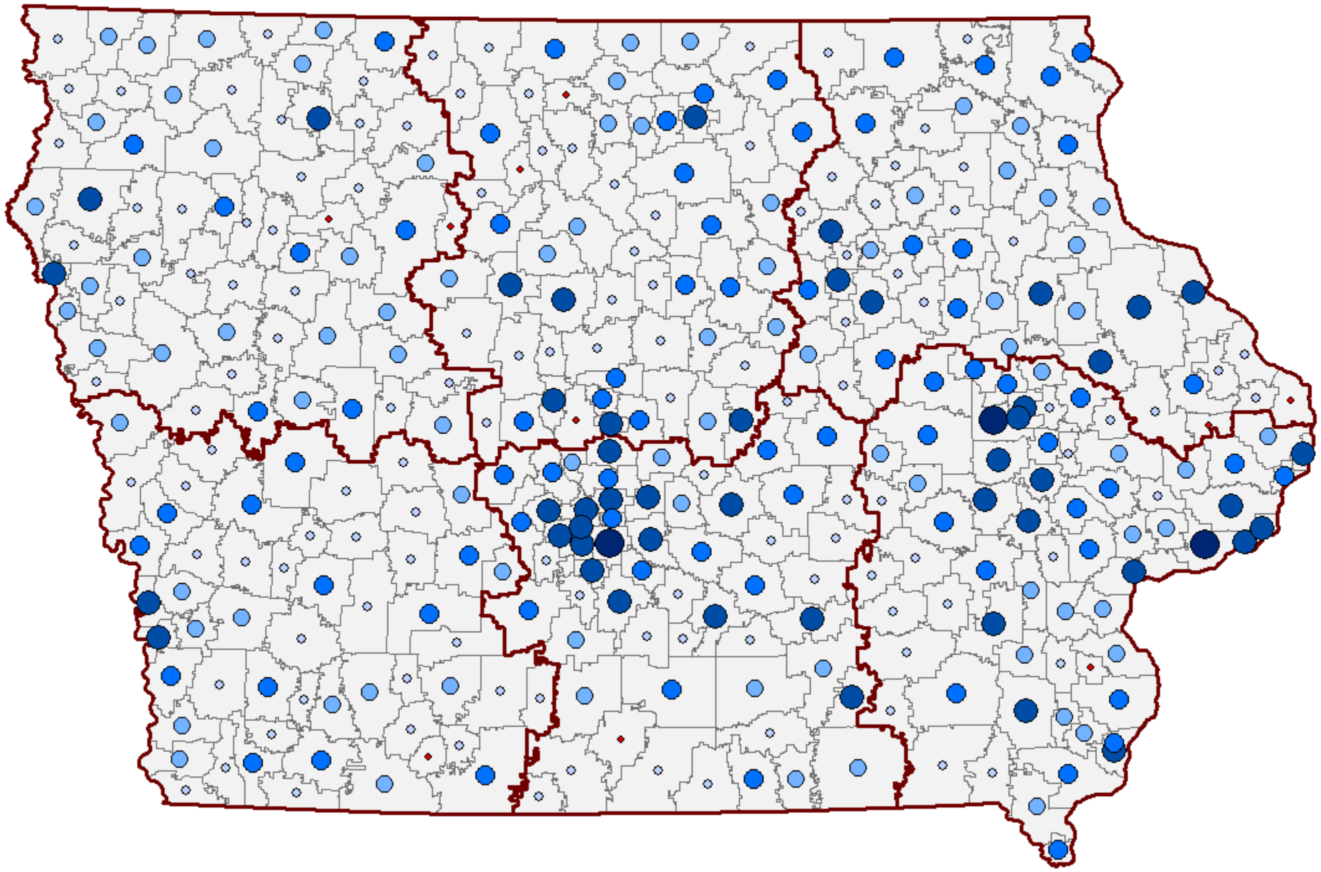



Iowa Teachers by District with Endorsements in Math 2009-10
Number of Teachers
0
1 - 3
4 - 5
6 - 10
11 - 75
76 - 204
STEM Region
Iowa STEM Monitoring Project July 2013

Iowa Teachers by District with Endorsements in Math 2010-11



Iowa Teachers by District with Endorsements in Math 2011-12

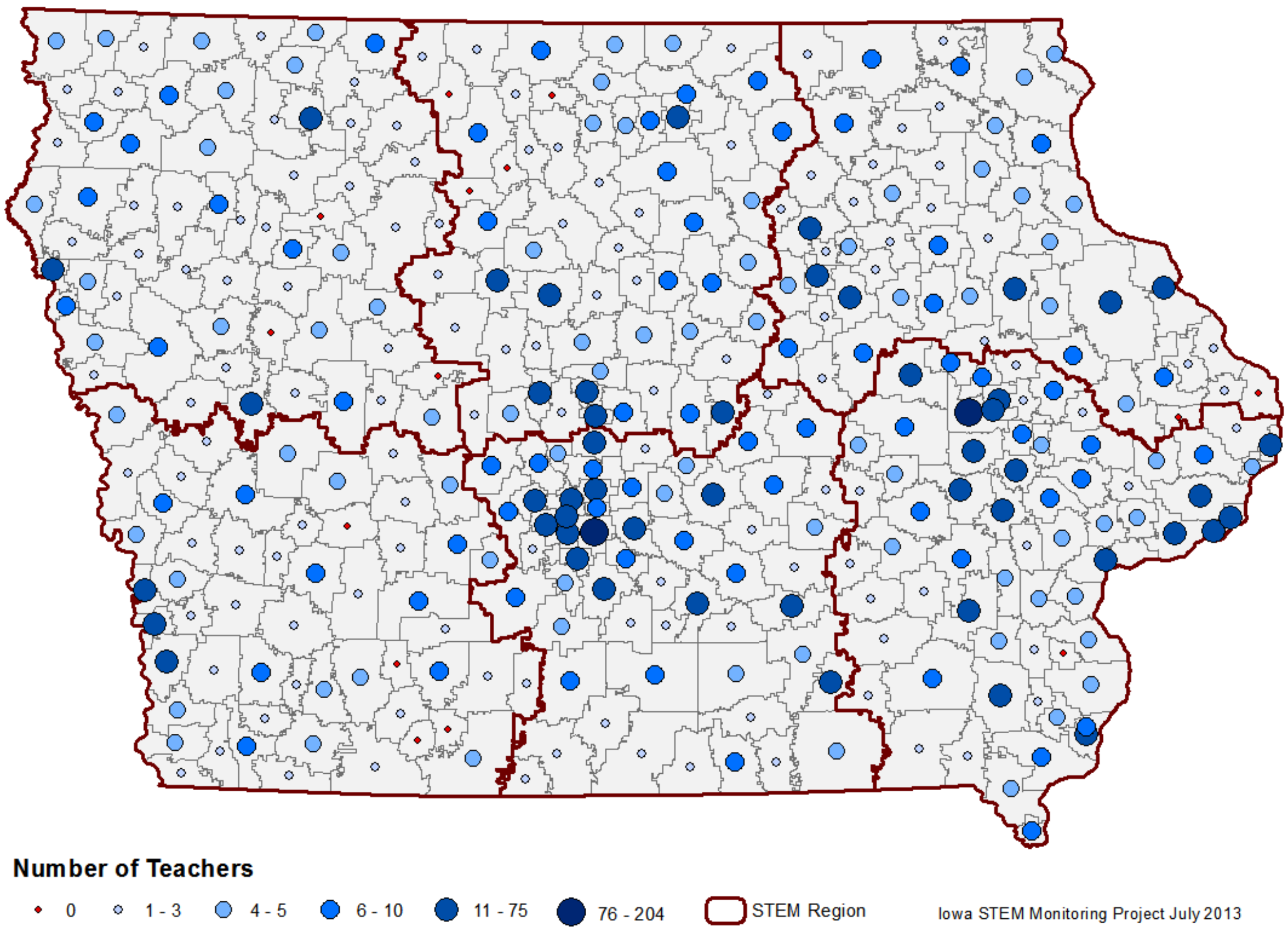


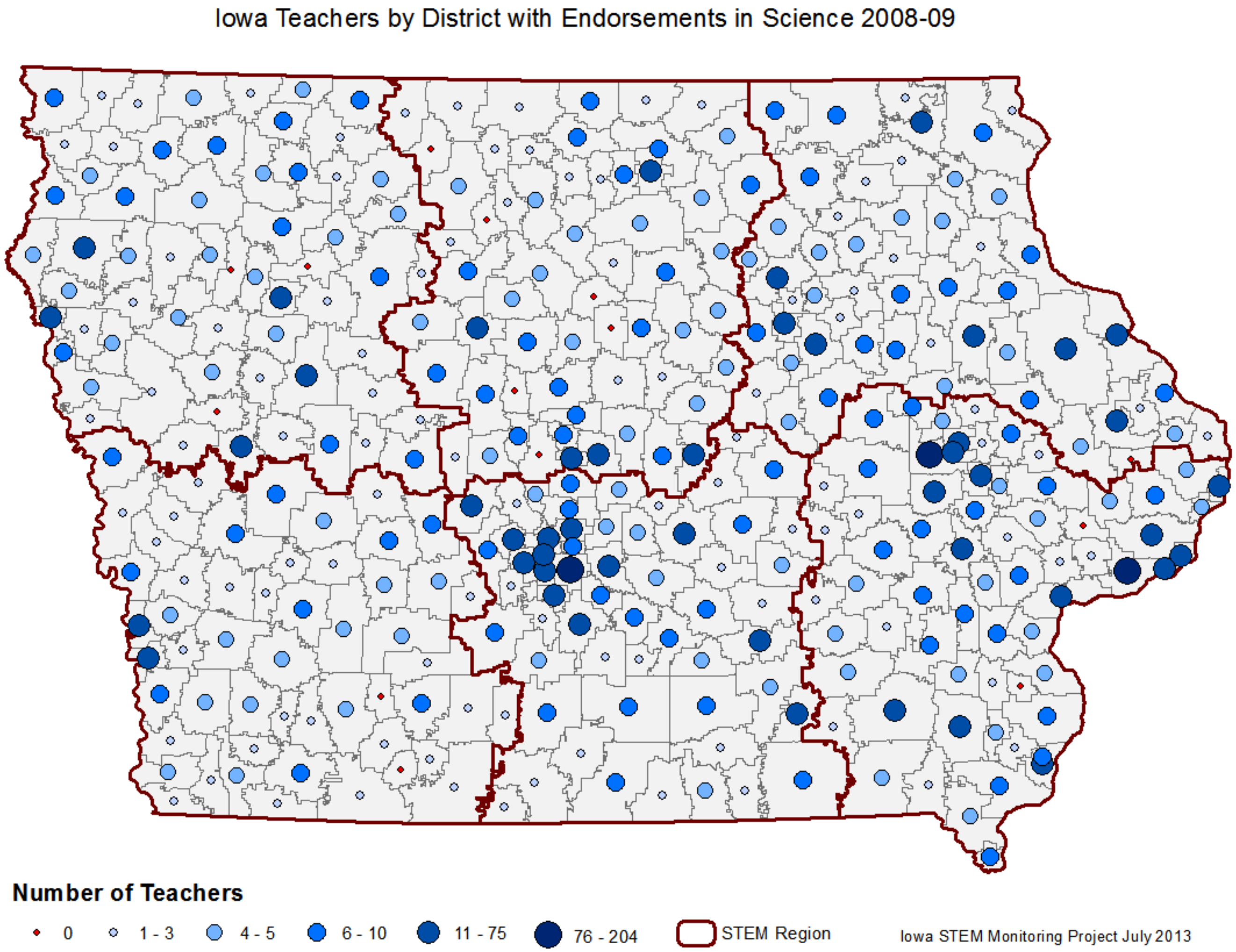
Number of Teachers

0 | 1 - 3 | 4 - 5 | 6 - 10 | 11 - 75 | 76 - 204 | STEM Region

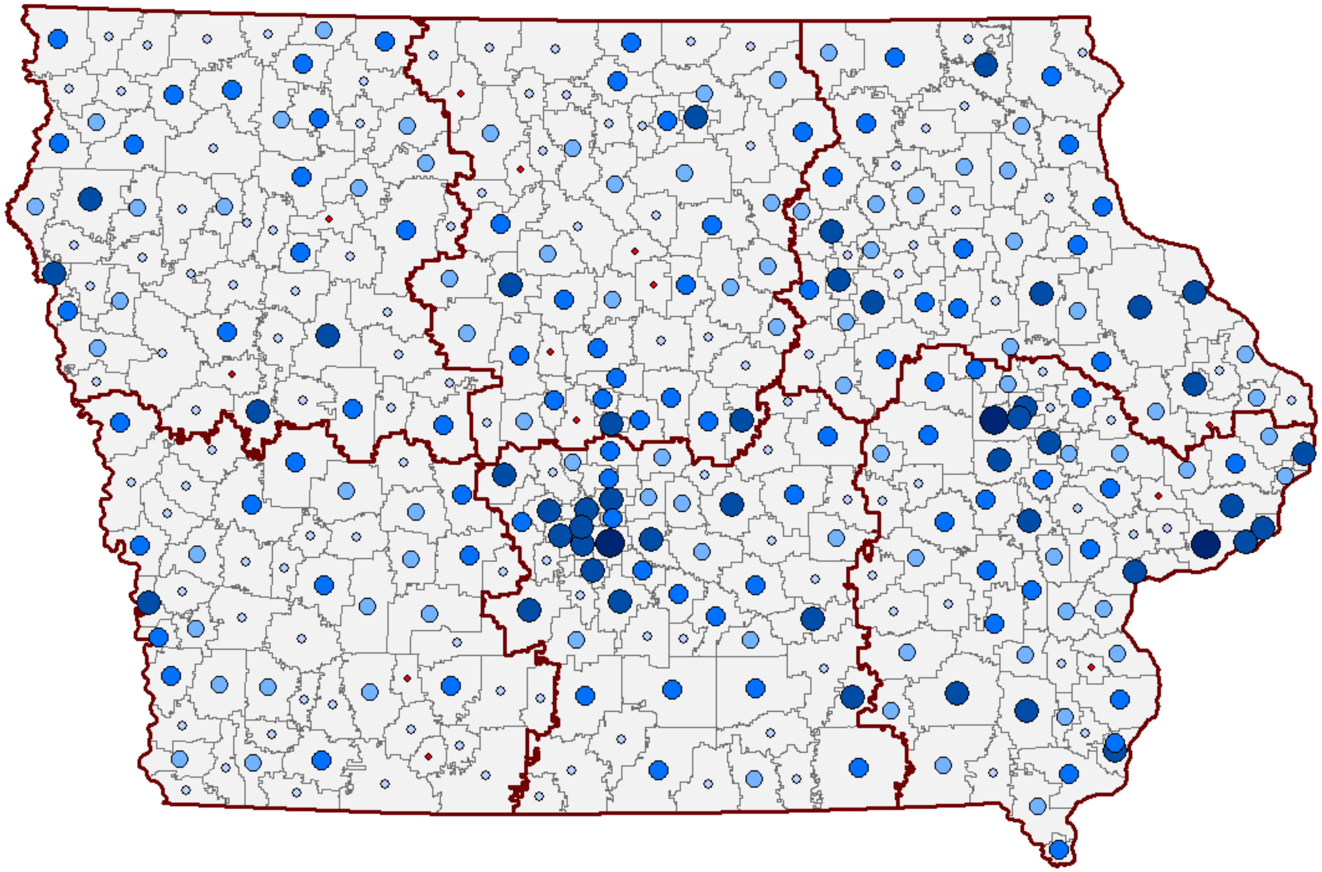
Iowa STEM Monitoring Project July 2013

Iowa Teachers by District with Endorsements in Math 2012-13




Iowa Teachers by District with Endorsements in Science 2008-09
Number of Teachers
0
1 - 3
4 - 5
6 - 10
11 - 75
76 - 204
STEM Region
Iowa STEM Monitoring Project July 2013

Iowa Teachers by District with Endorsements in Science 2009-10

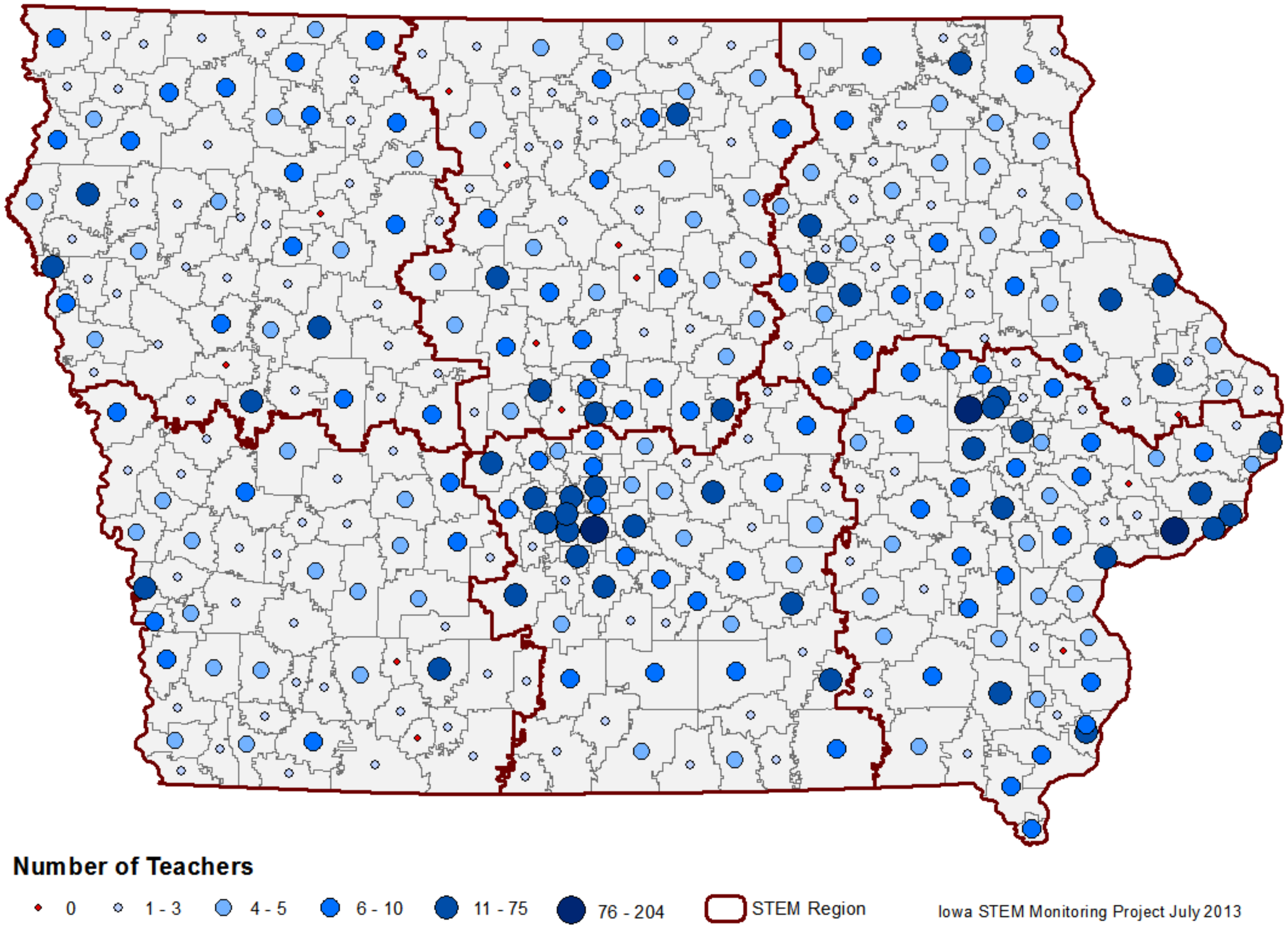


Number of Teachers

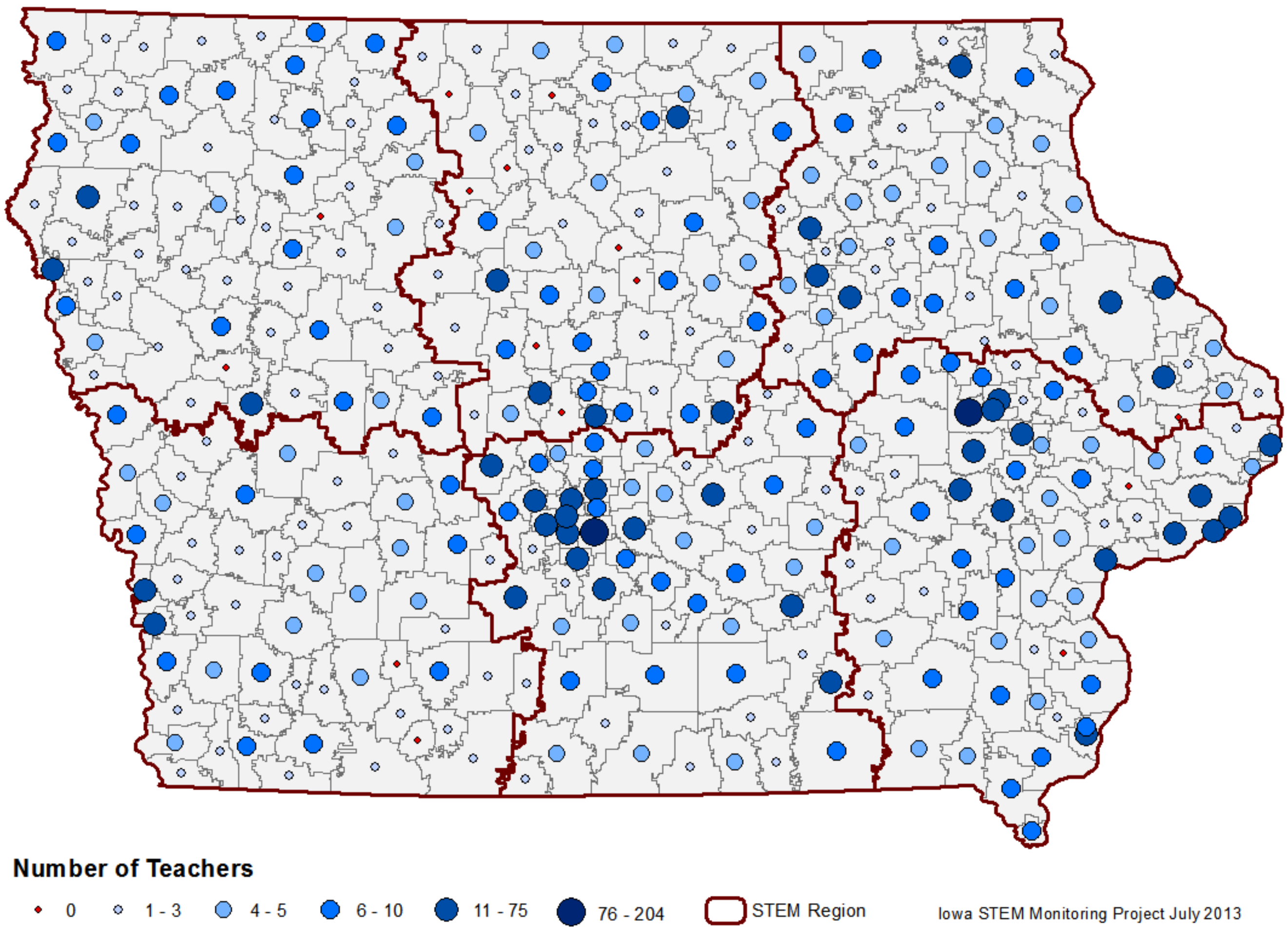
0 · 1 - 3 · 4 - 5 · 6 - 10 · 11 - 75 · 76 - 204 · STEM Region

Iowa STEM Monitoring Project July 2013

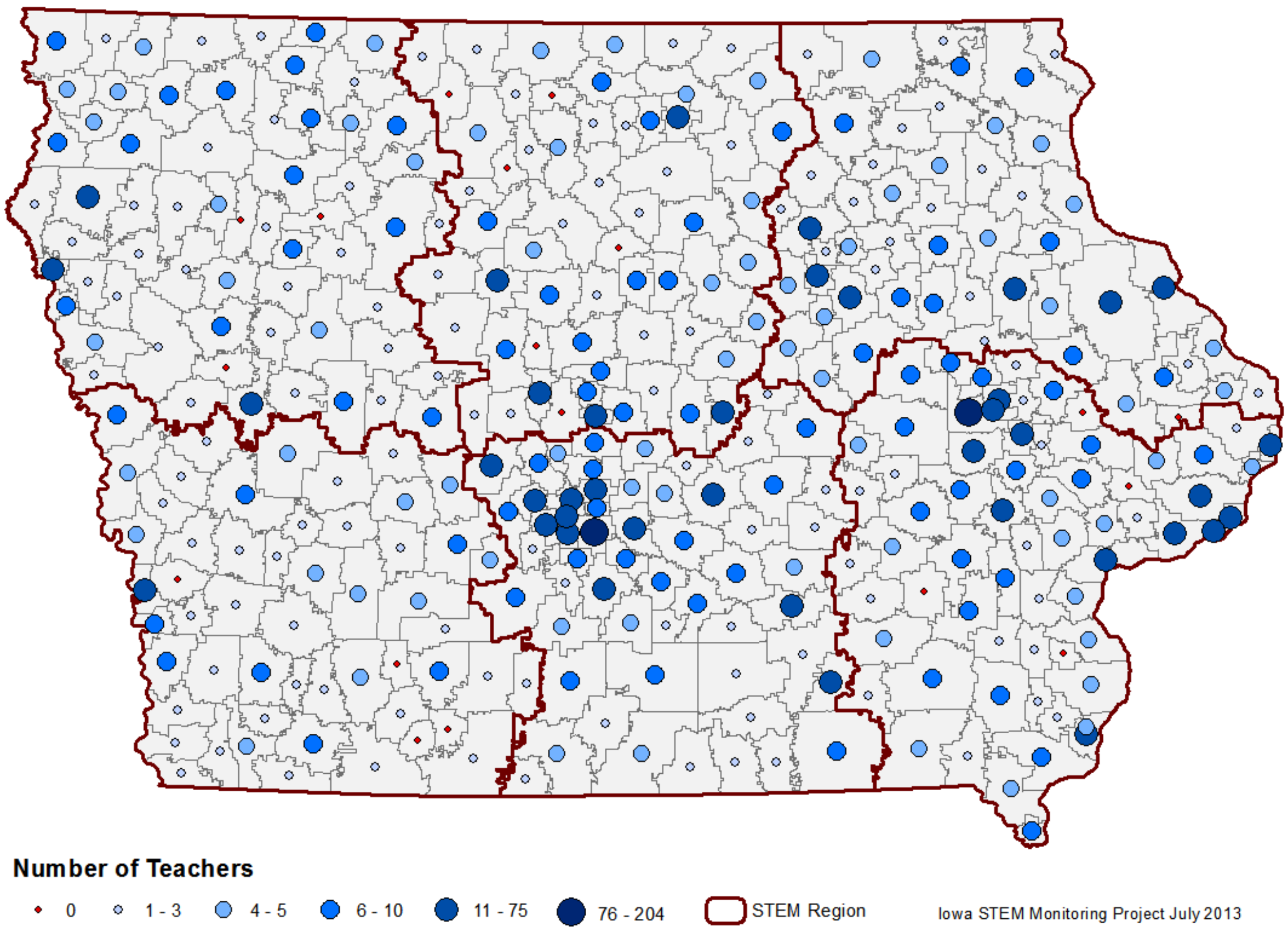
Iowa Teachers by District with Endorsements in Science 2010-11

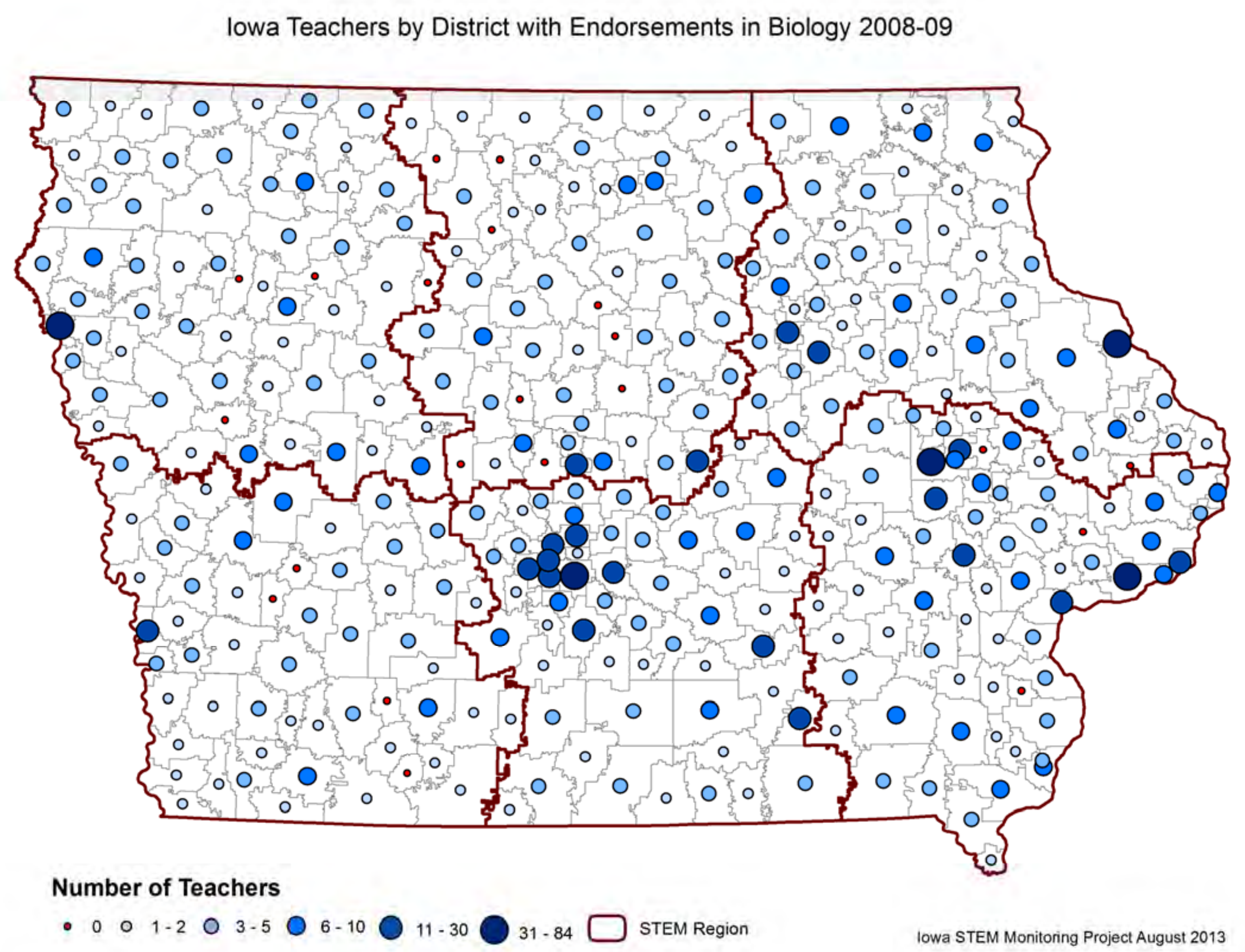


Iowa Teachers by District with Endorsements in Science 2011-12

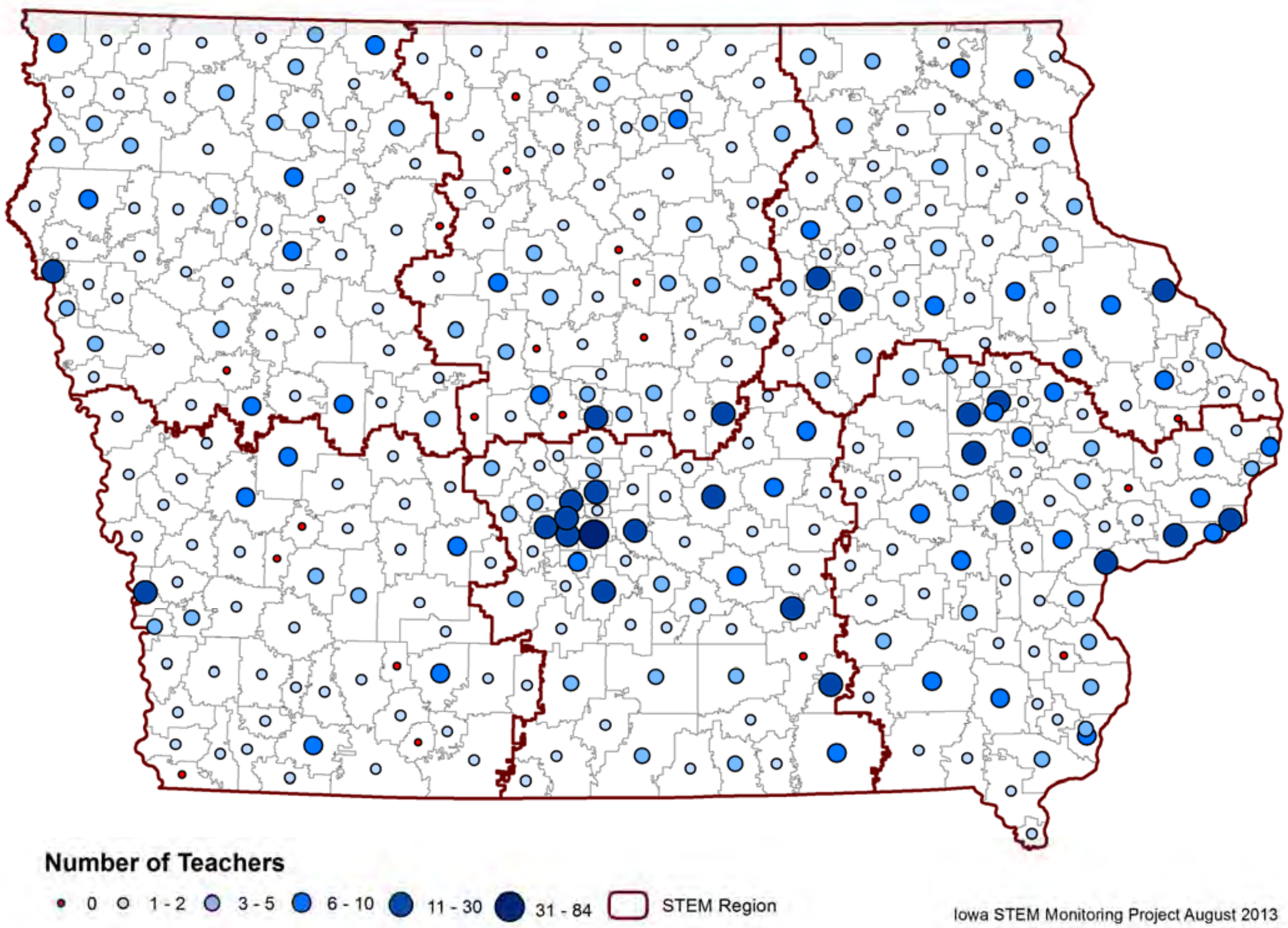


Iowa Teachers by District with Endorsements in Science 2012-13

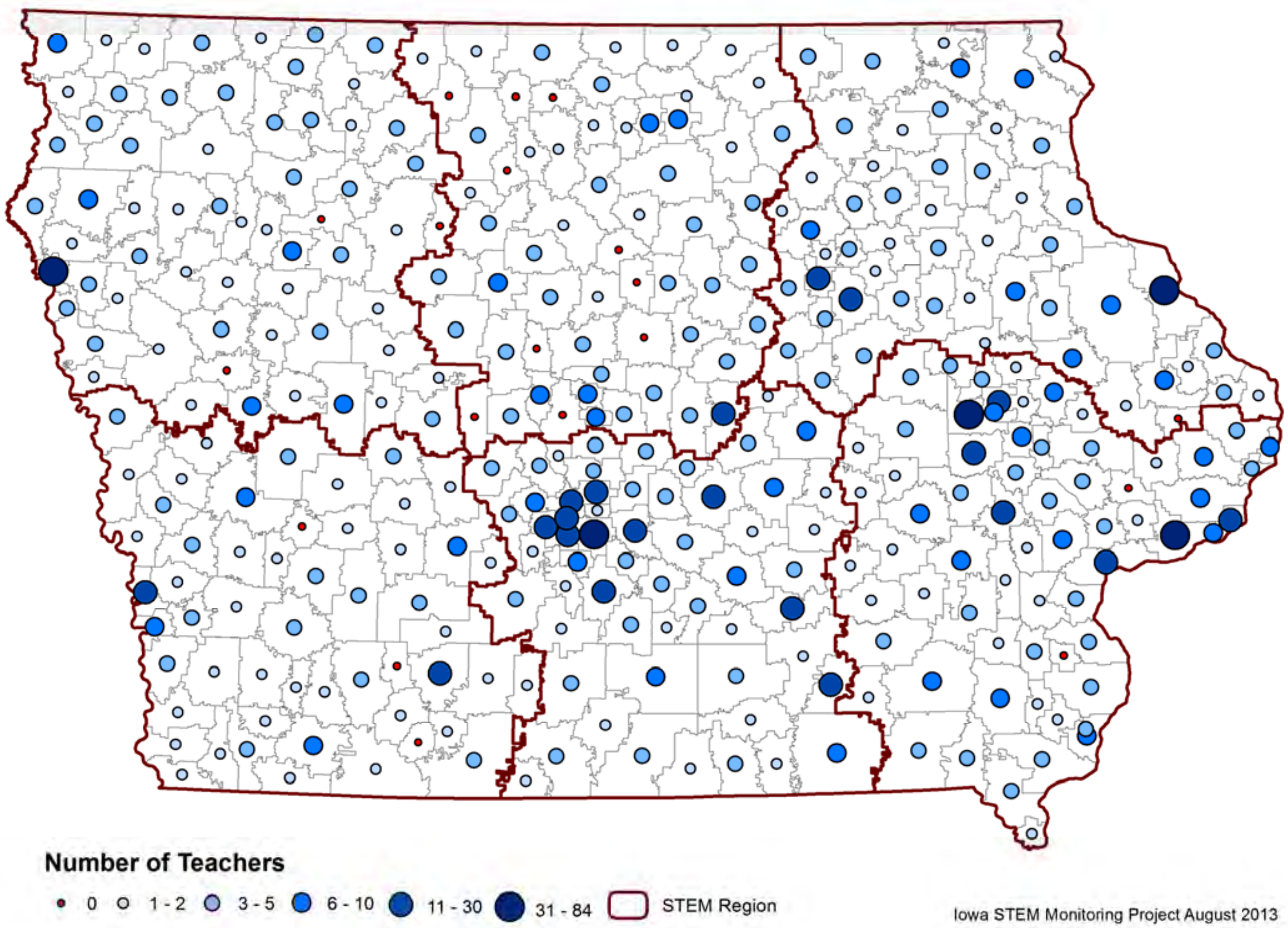



Iowa Teachers by District with Endorsements in Biology 2008-09
Number of Teachers
0
1 - 2
3 - 5
6 - 10
11 - 30
31 - 84
STEM Region
Iowa STEM Monitoring Project August 2013

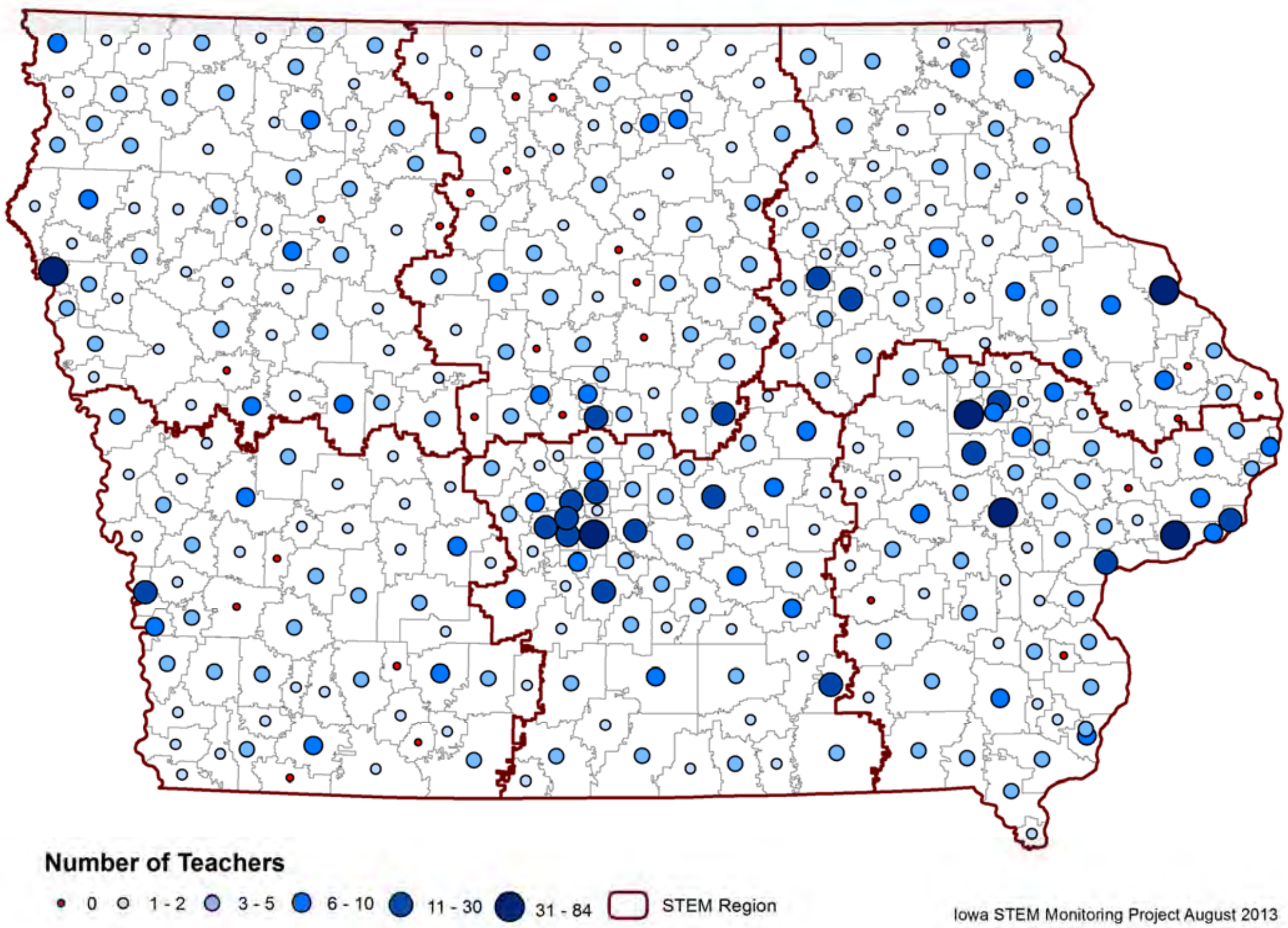
Iowa Teachers by District with Endorsements in Biology 2009-10



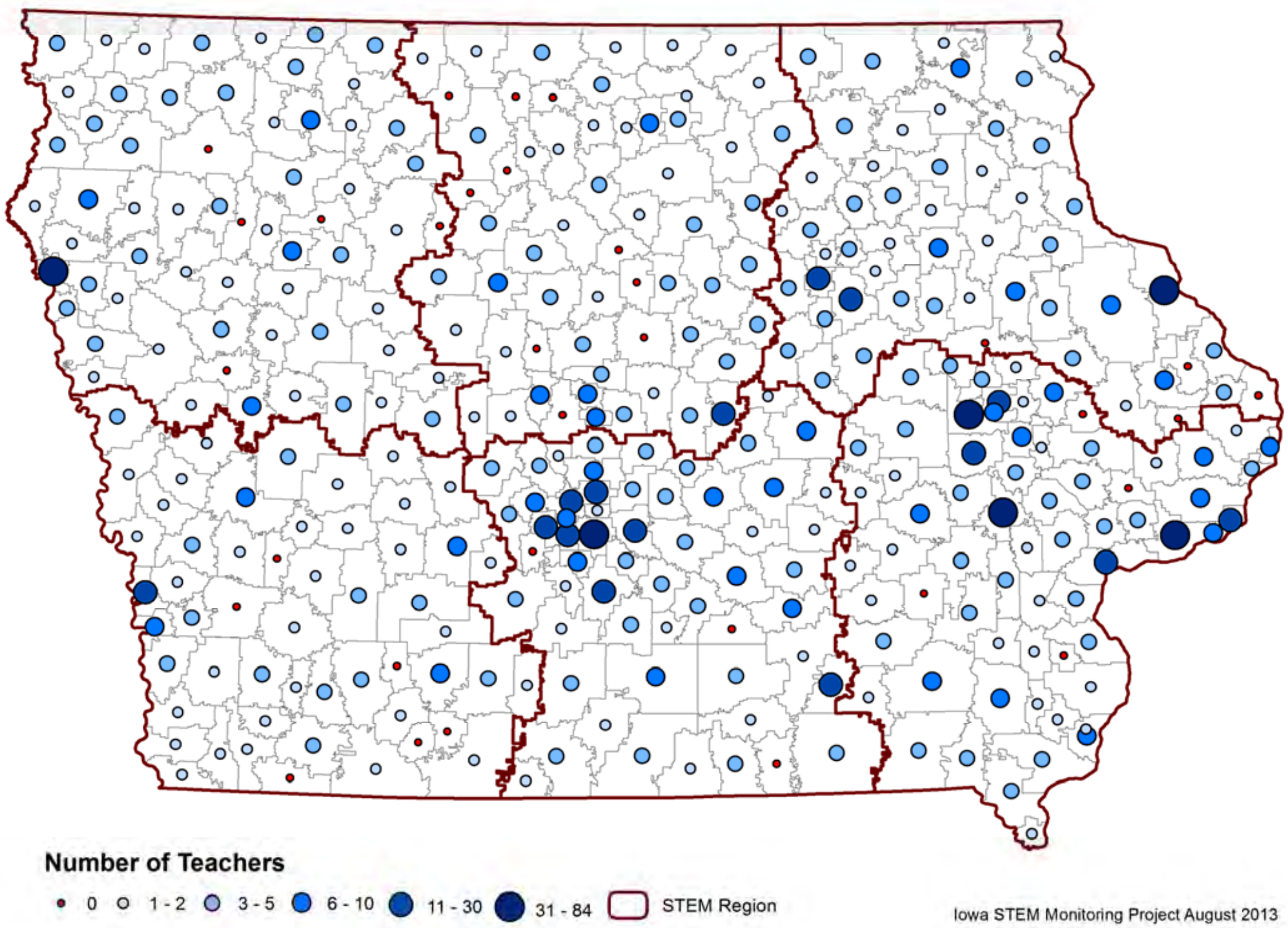
Iowa Teachers by District with Endorsements in Biology 2010-11



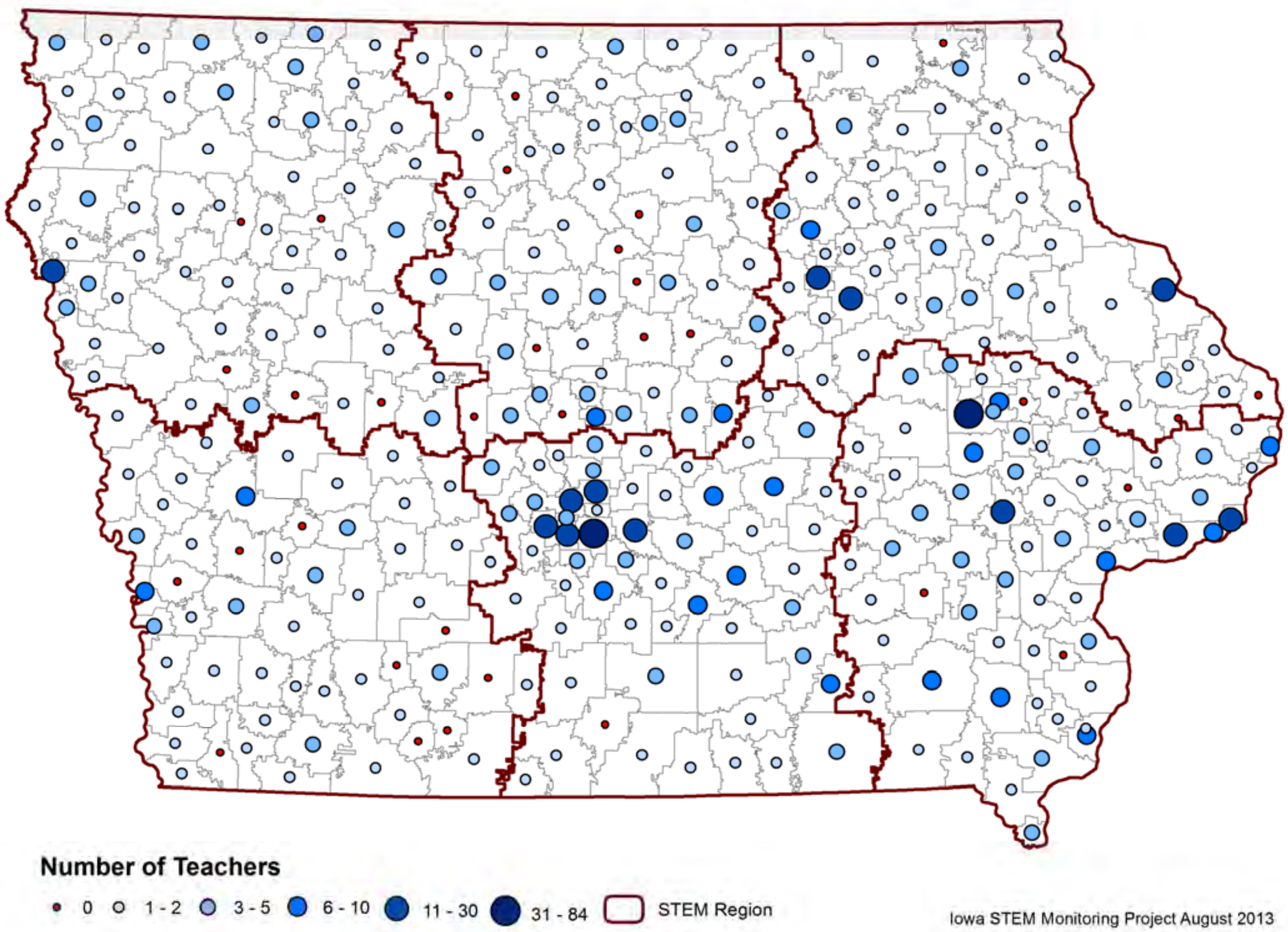
Iowa Teachers by District with Endorsements in Biology 2011-12

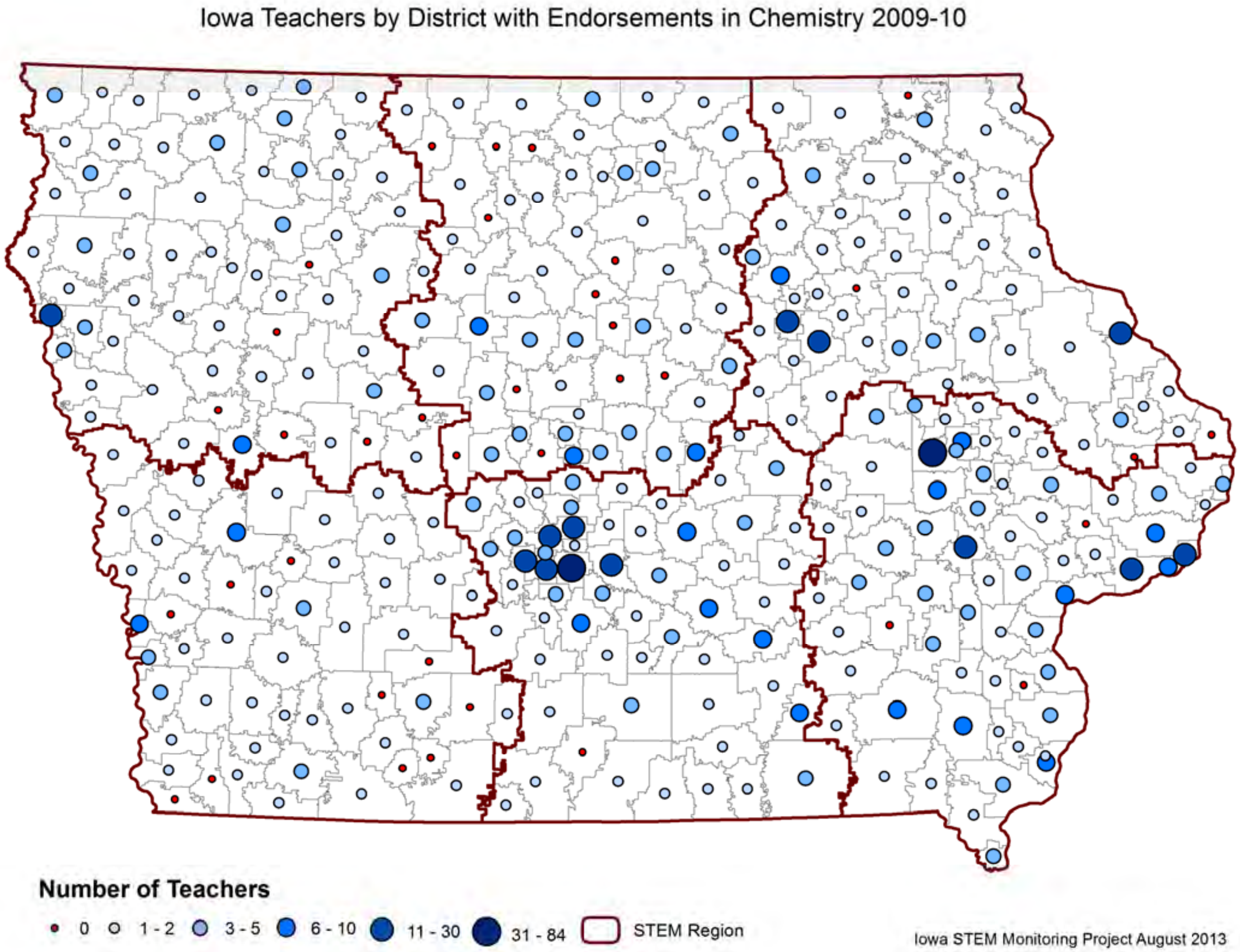


Iowa Teachers by District with Endorsements in Biology 2012-13

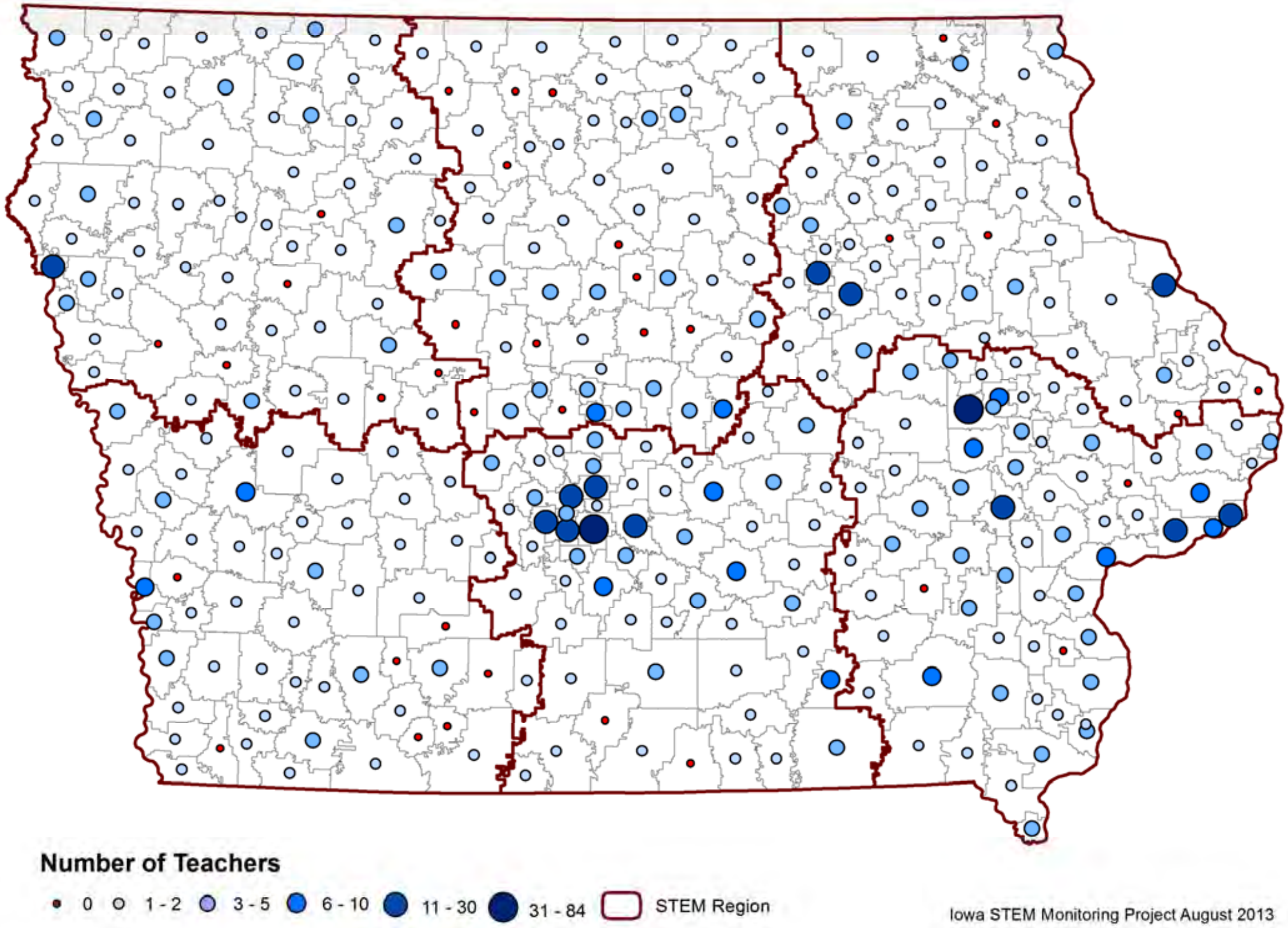


Iowa Teachers by District with Endorsements in Chemistry 2008-09

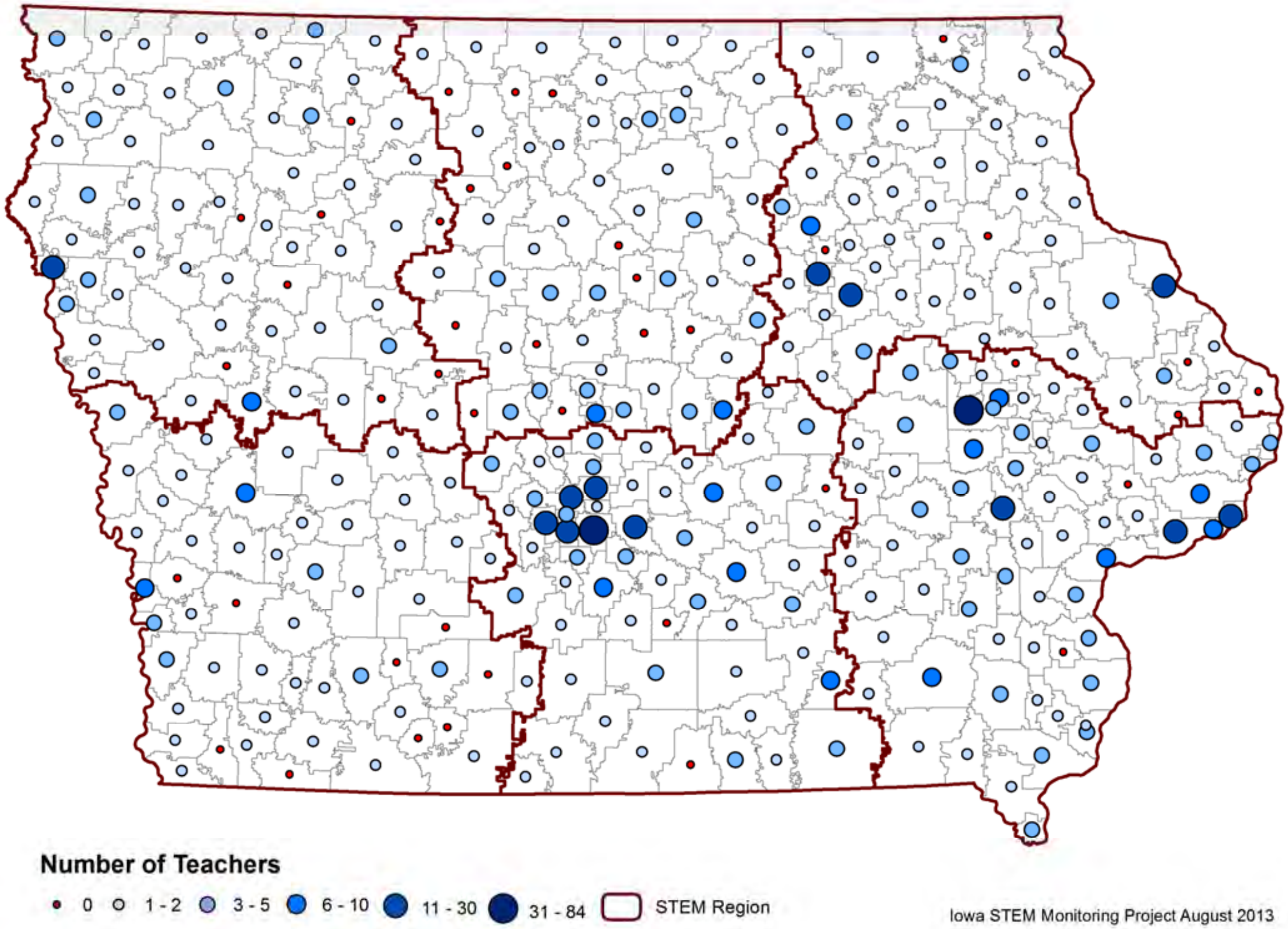



Iowa Teachers by District with Endorsements in Chemistry 2009-10
Number of Teachers
0
1 - 2
3 - 5
6 - 10
11 - 30
31 - 84
STEM Region
Iowa STEM Monitoring Project August 2013

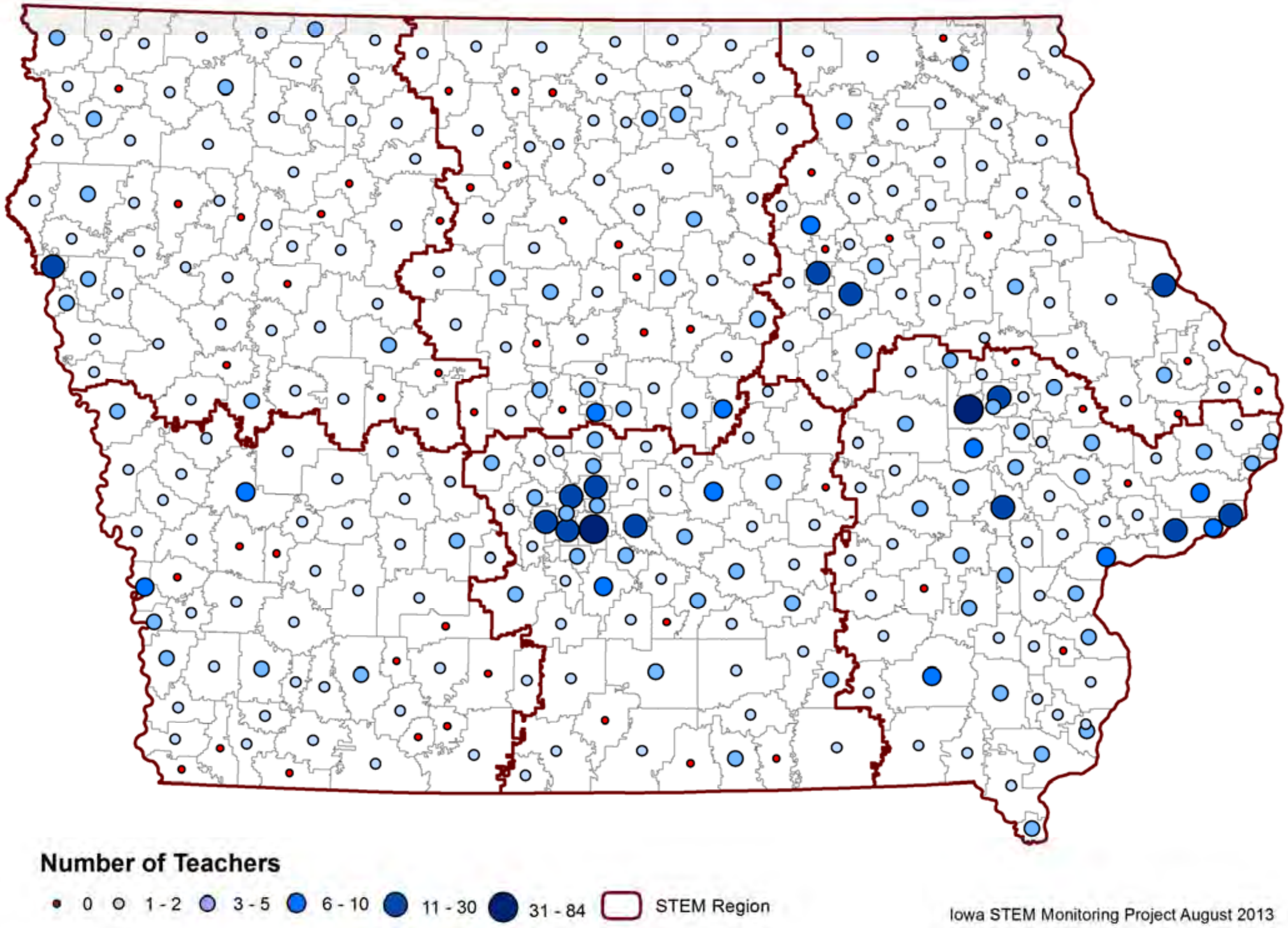
Iowa Teachers by District with Endorsements in Chemistry 2010-11



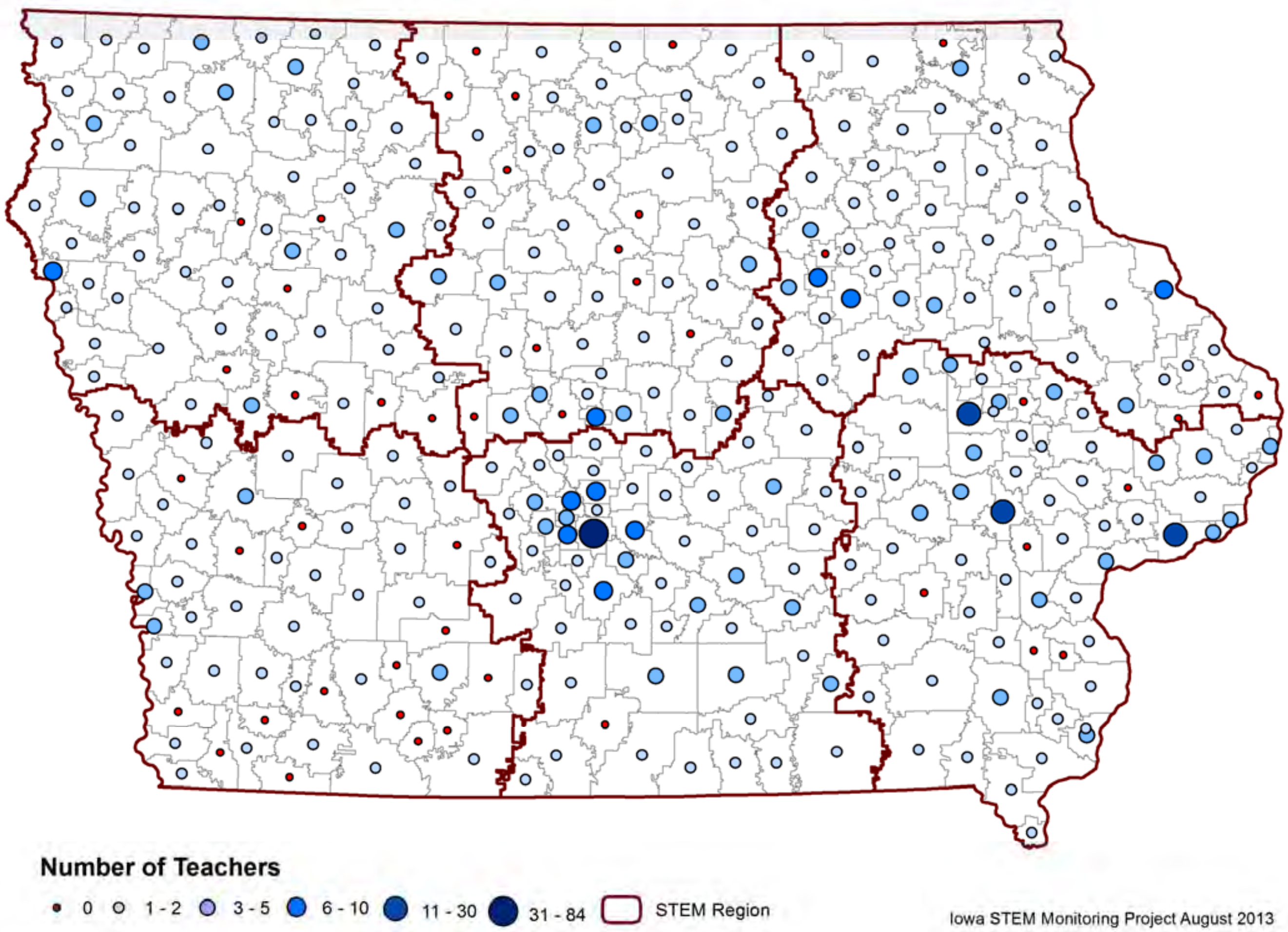
Iowa Teachers by District with Endorsements in Chemistry 2011-12



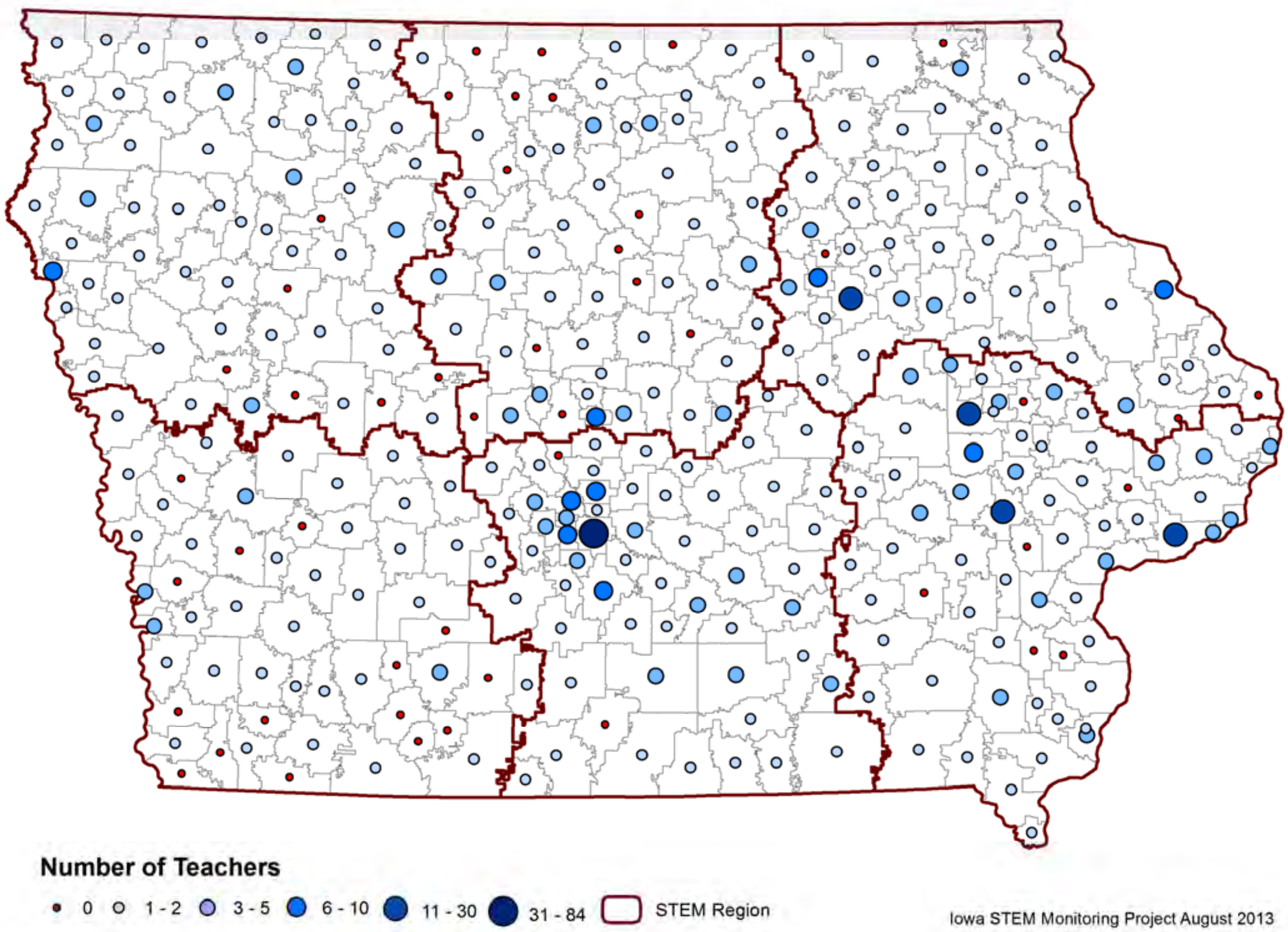
Iowa Teachers by District with Endorsements in Chemistry 2012-13



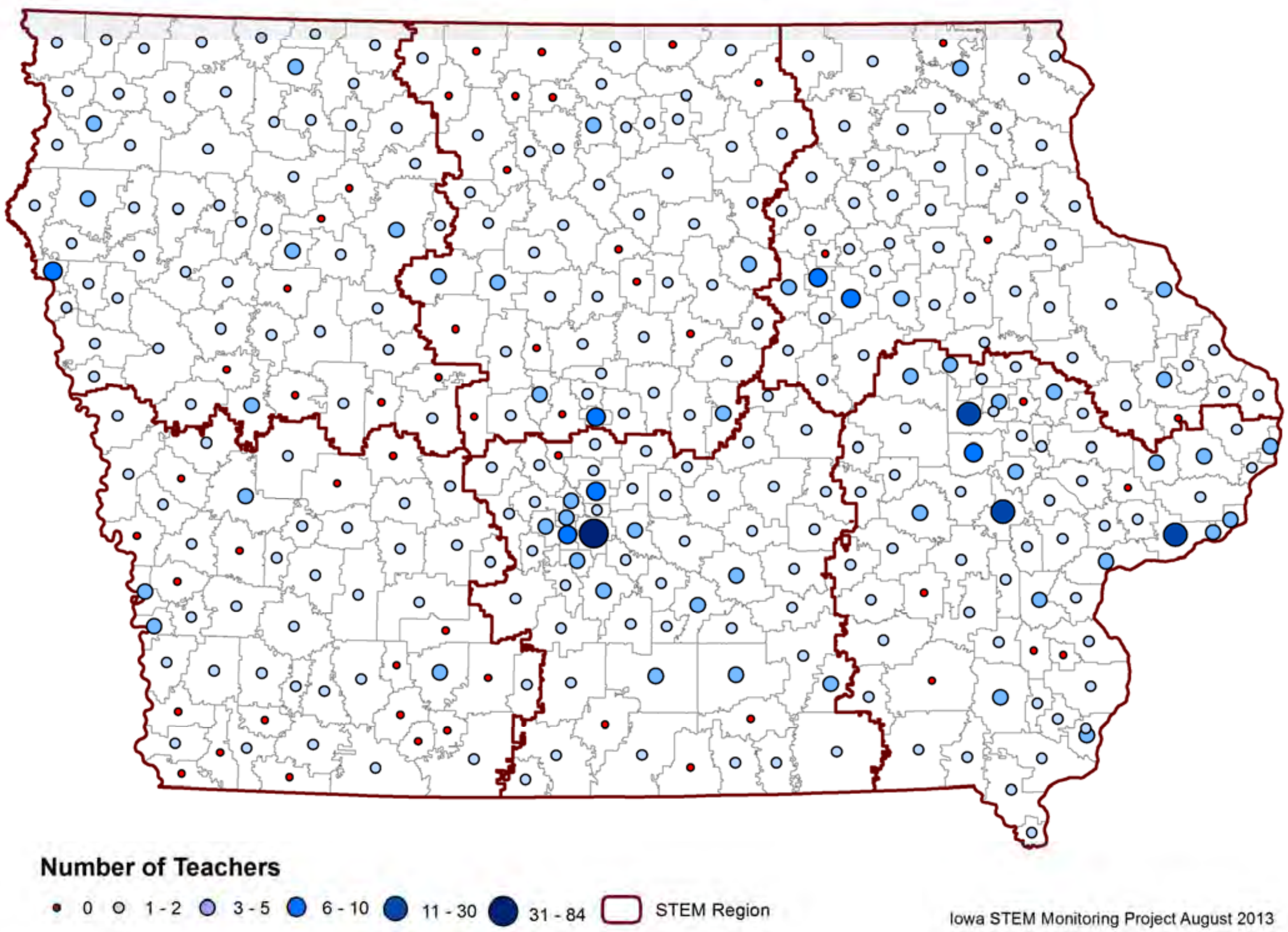
Iowa Teachers by District with Endorsements in Physics 2008-09



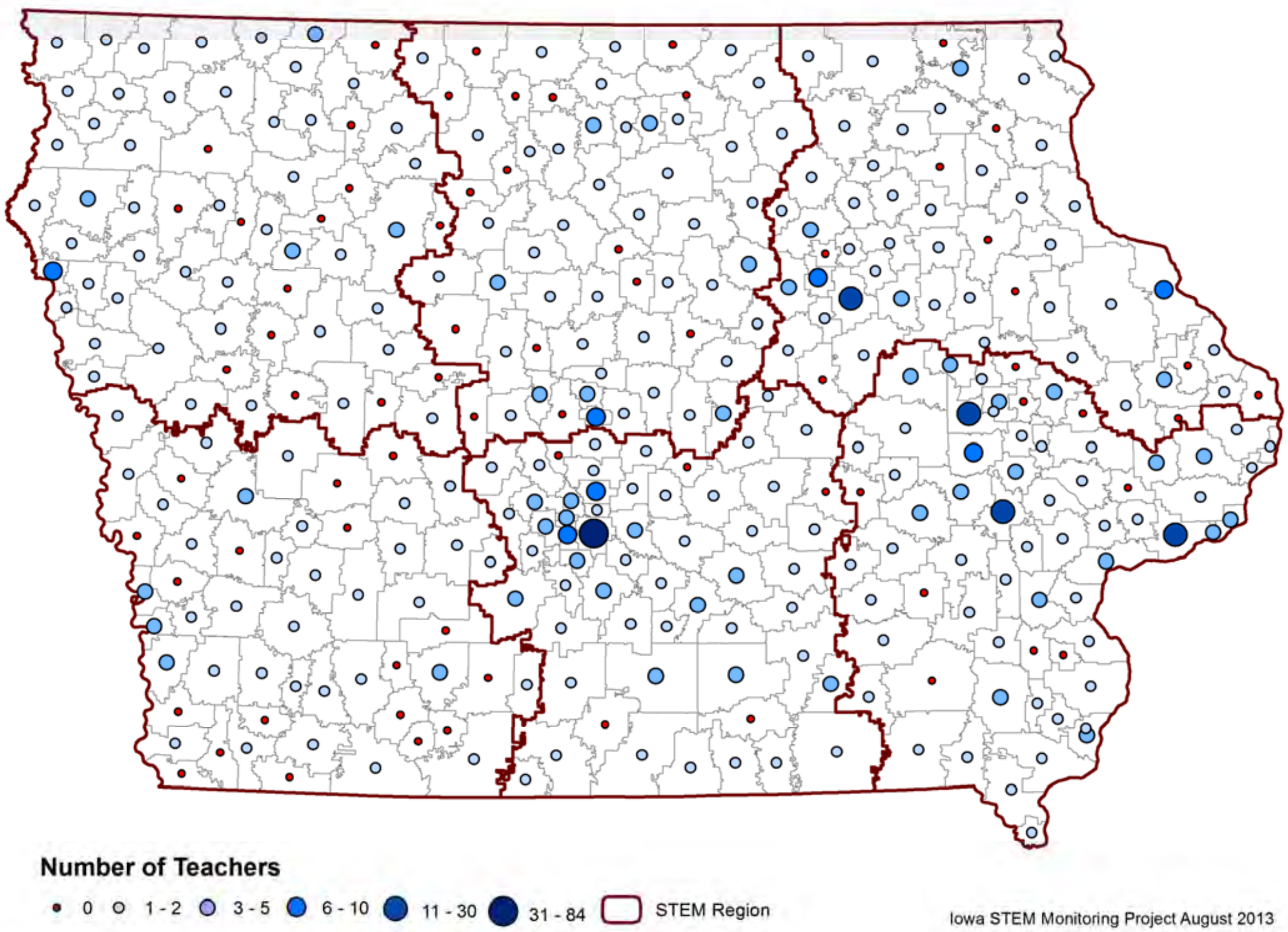
Iowa Teachers by District with Endorsements in Physics 2009-10



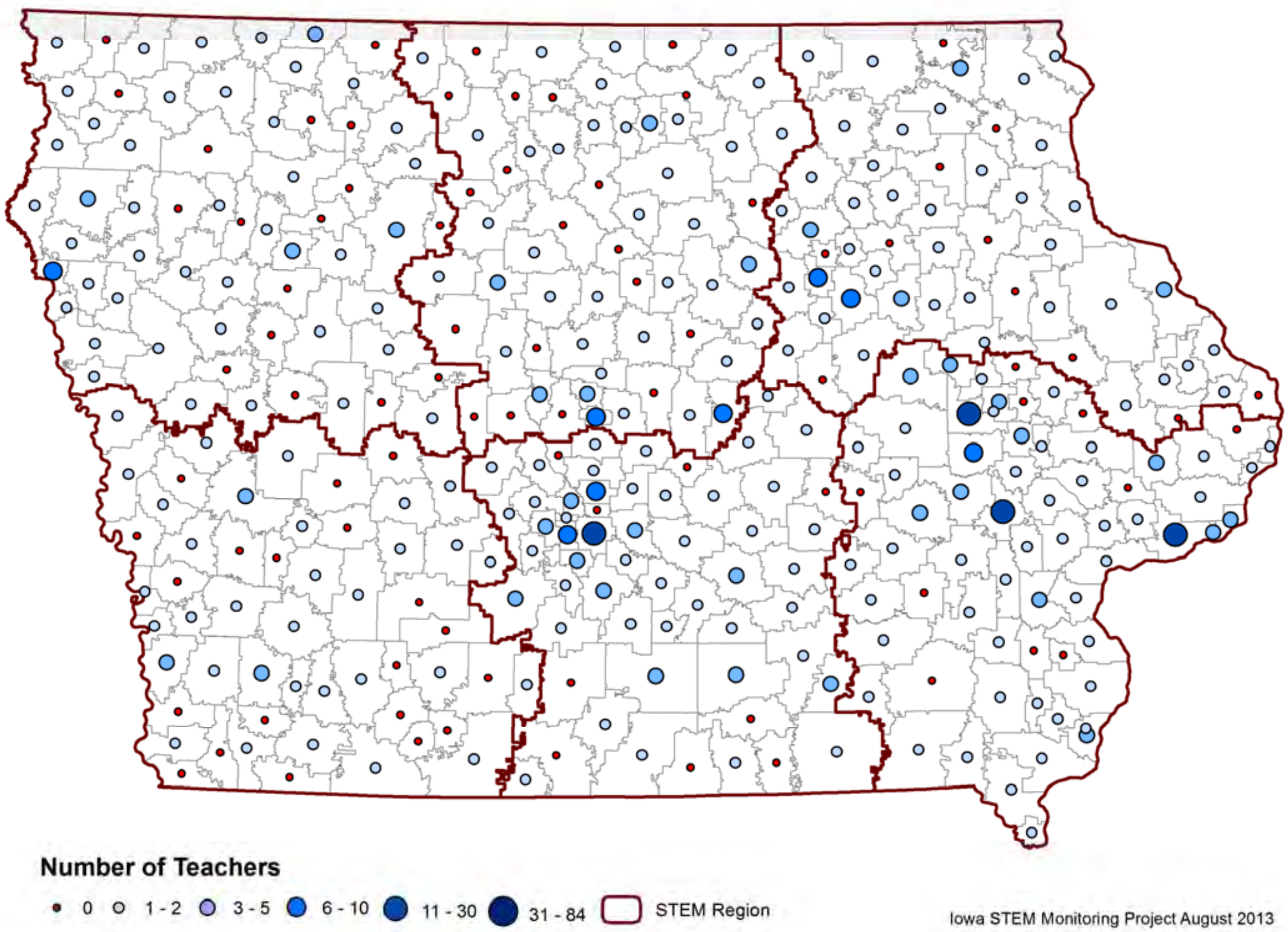
Iowa Teachers by District with Endorsements in Physics 2010-11



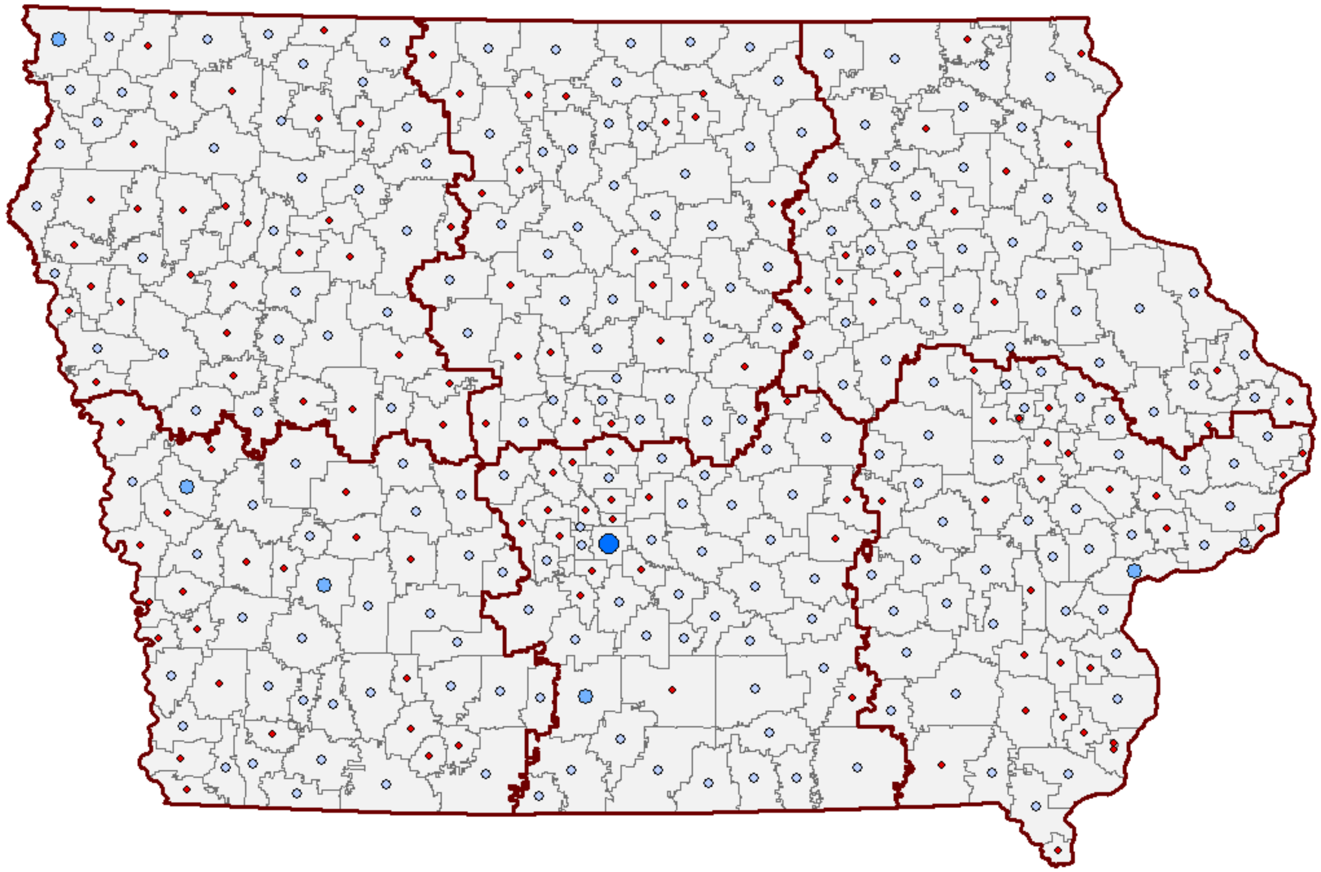
Iowa Teachers by District with Endorsements in Physics 2011-12



Iowa Teachers by District with Endorsements in Physics 2012-13



Iowa Teachers by District with Endorsements in Agriculture 2008-09

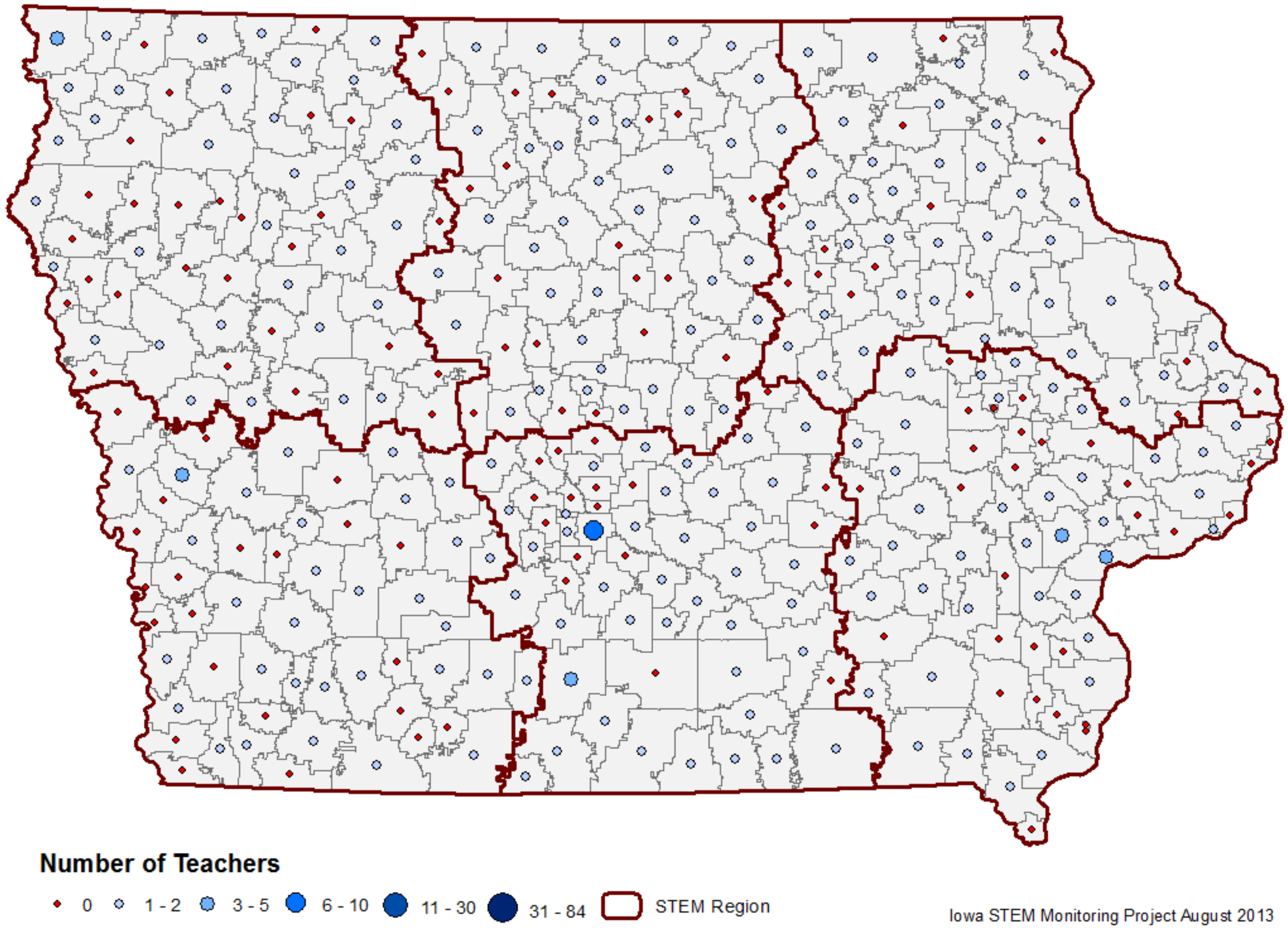


Number of Teachers

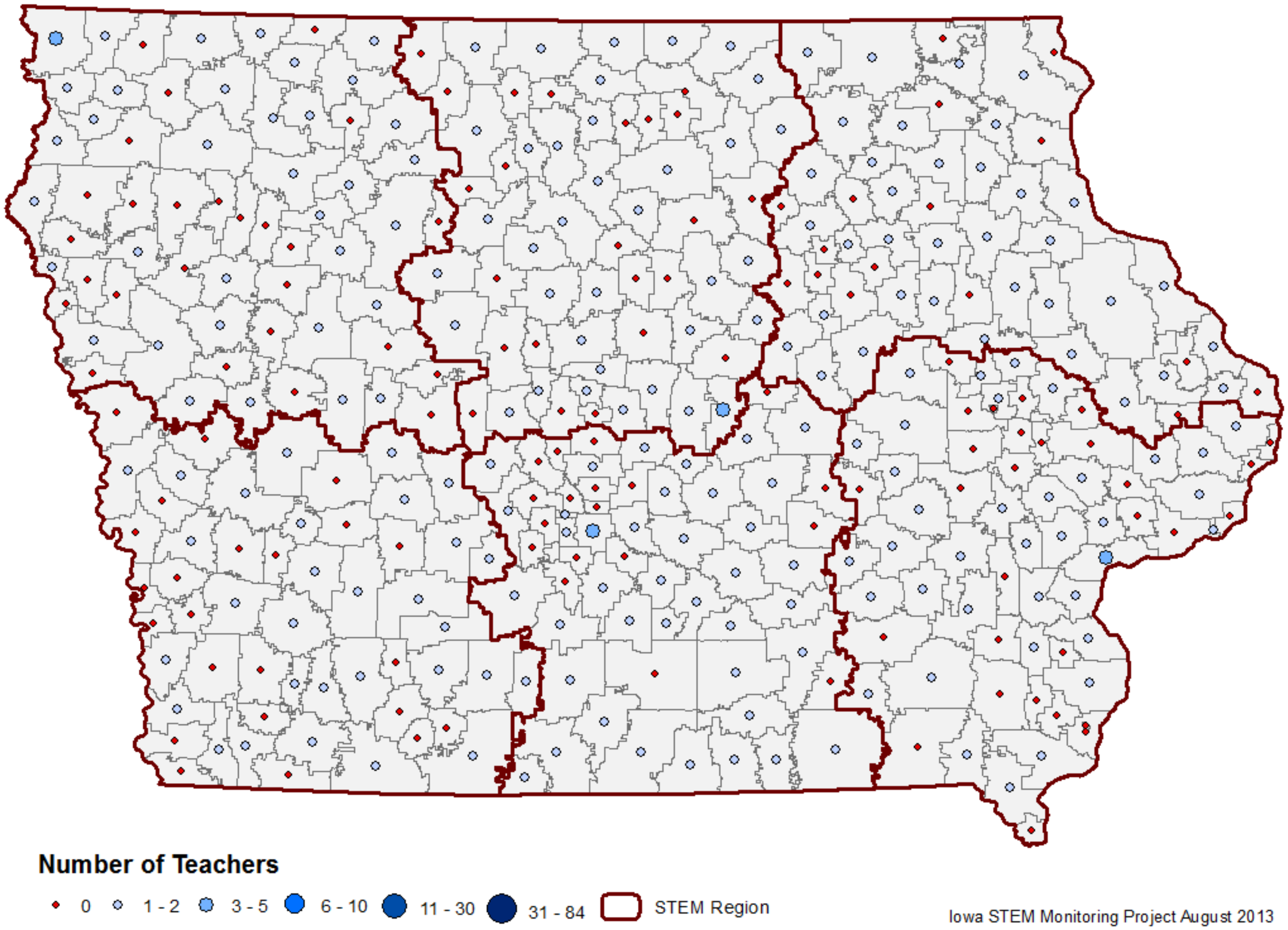
0 | 1 - 2 | 3 - 5 | 6 - 10 | 11 - 30 | 31 - 84 | STEM Region

Iowa STEM Monitoring Project August 2013

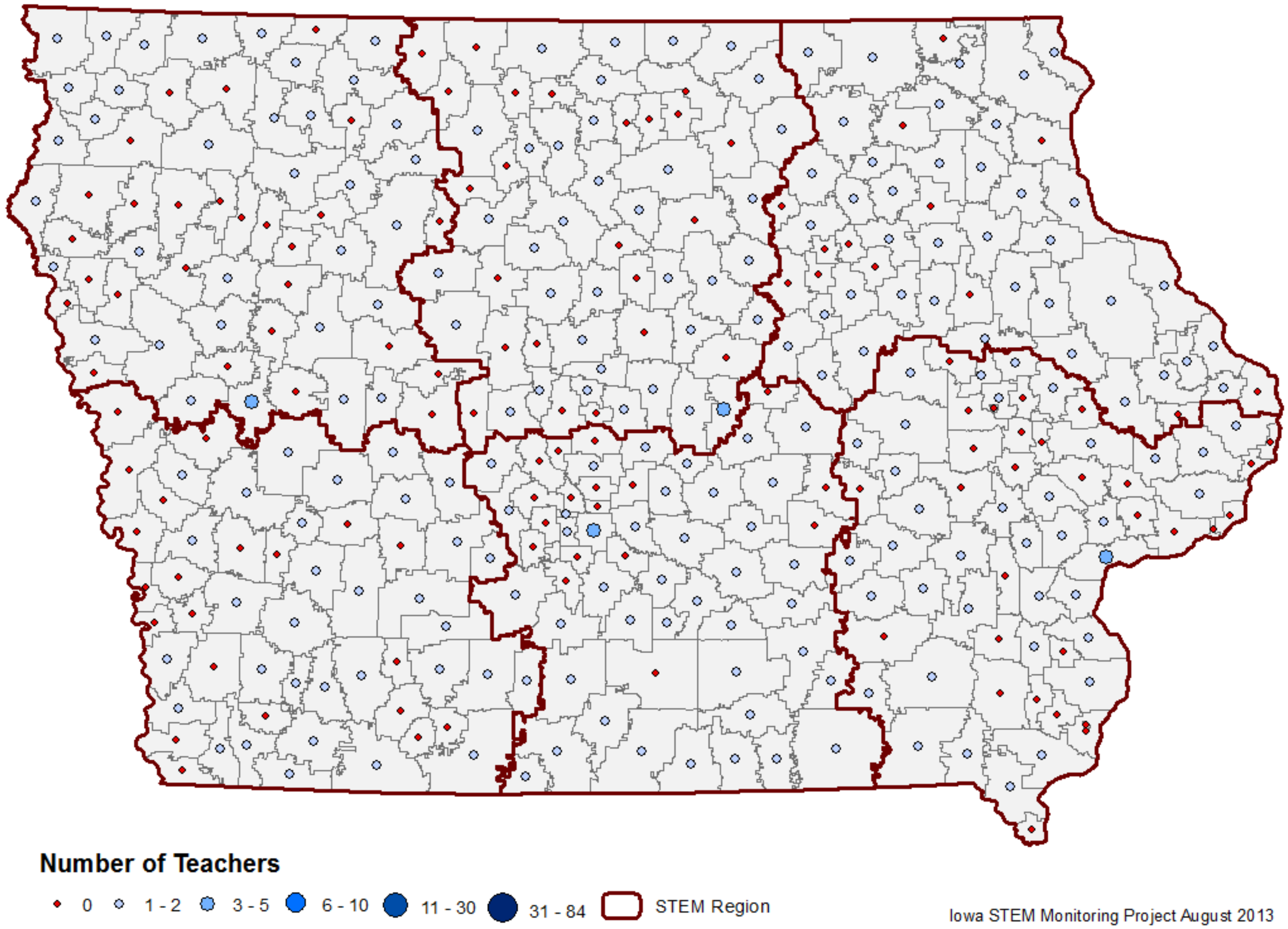
Iowa Teachers by District with Endorsements in Agriculture 2009-10



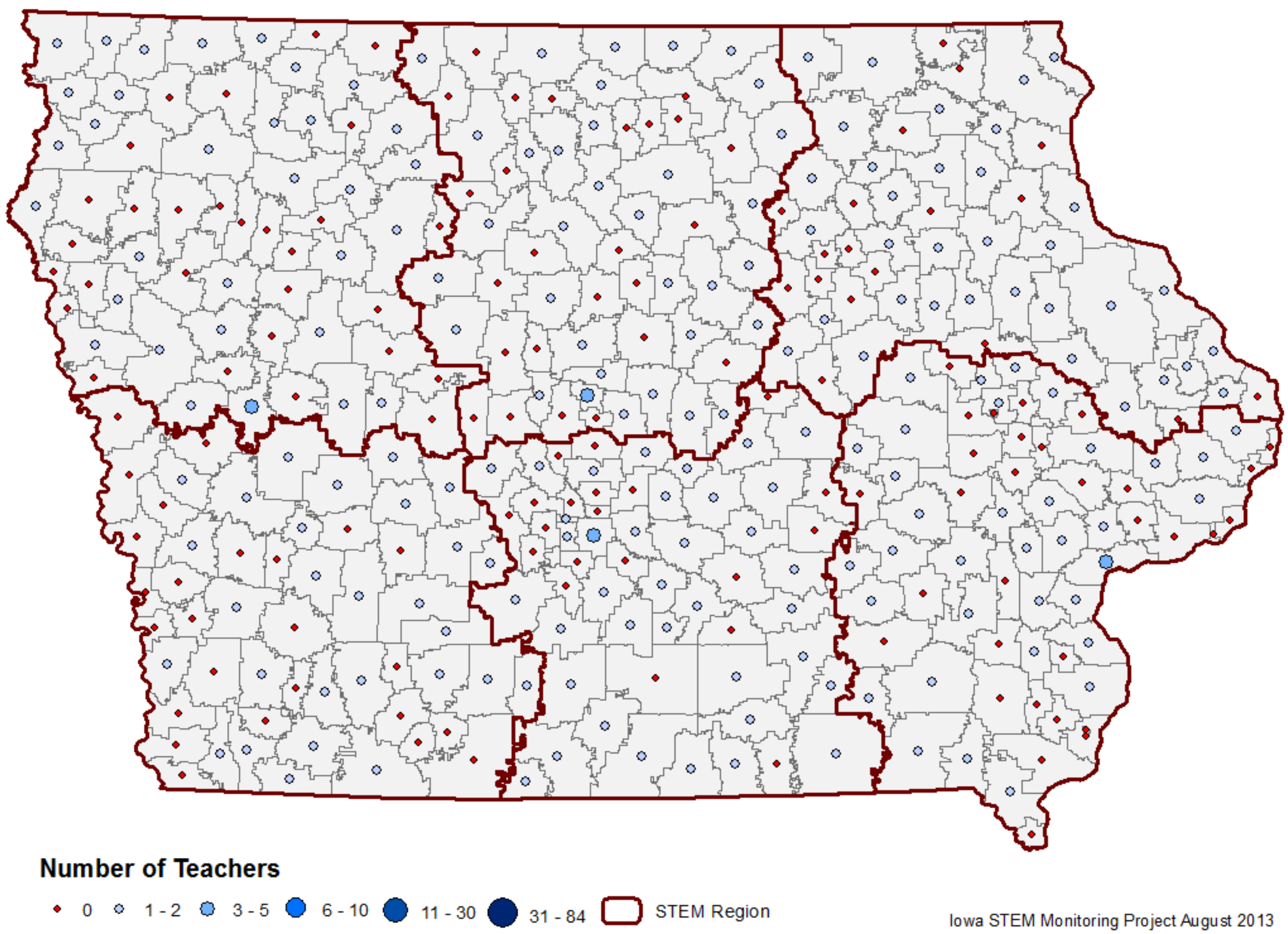
Iowa Teachers by District with Endorsements in Agriculture 2010-11



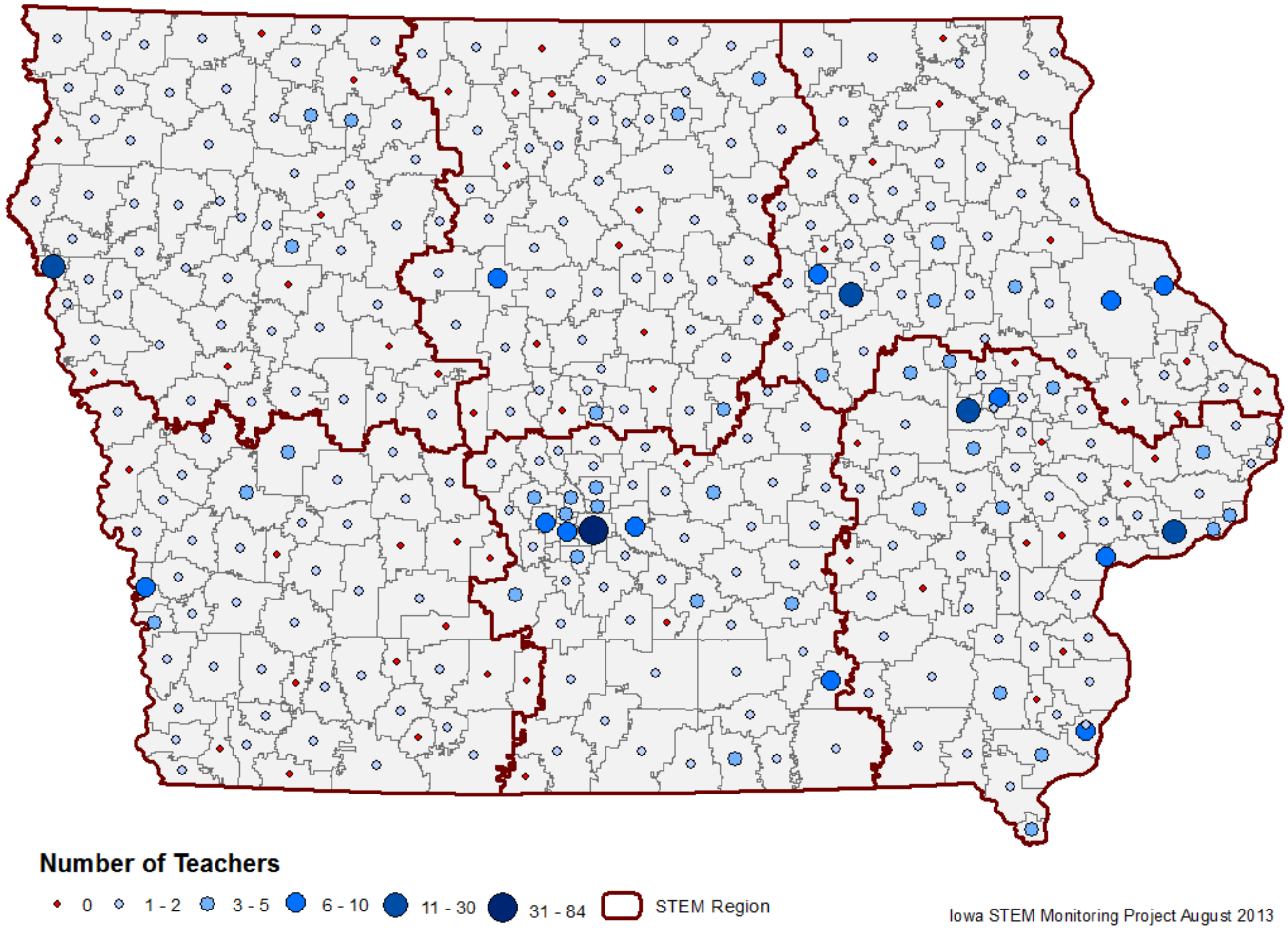
Iowa Teachers by District with Endorsements in Agriculture 2011-12



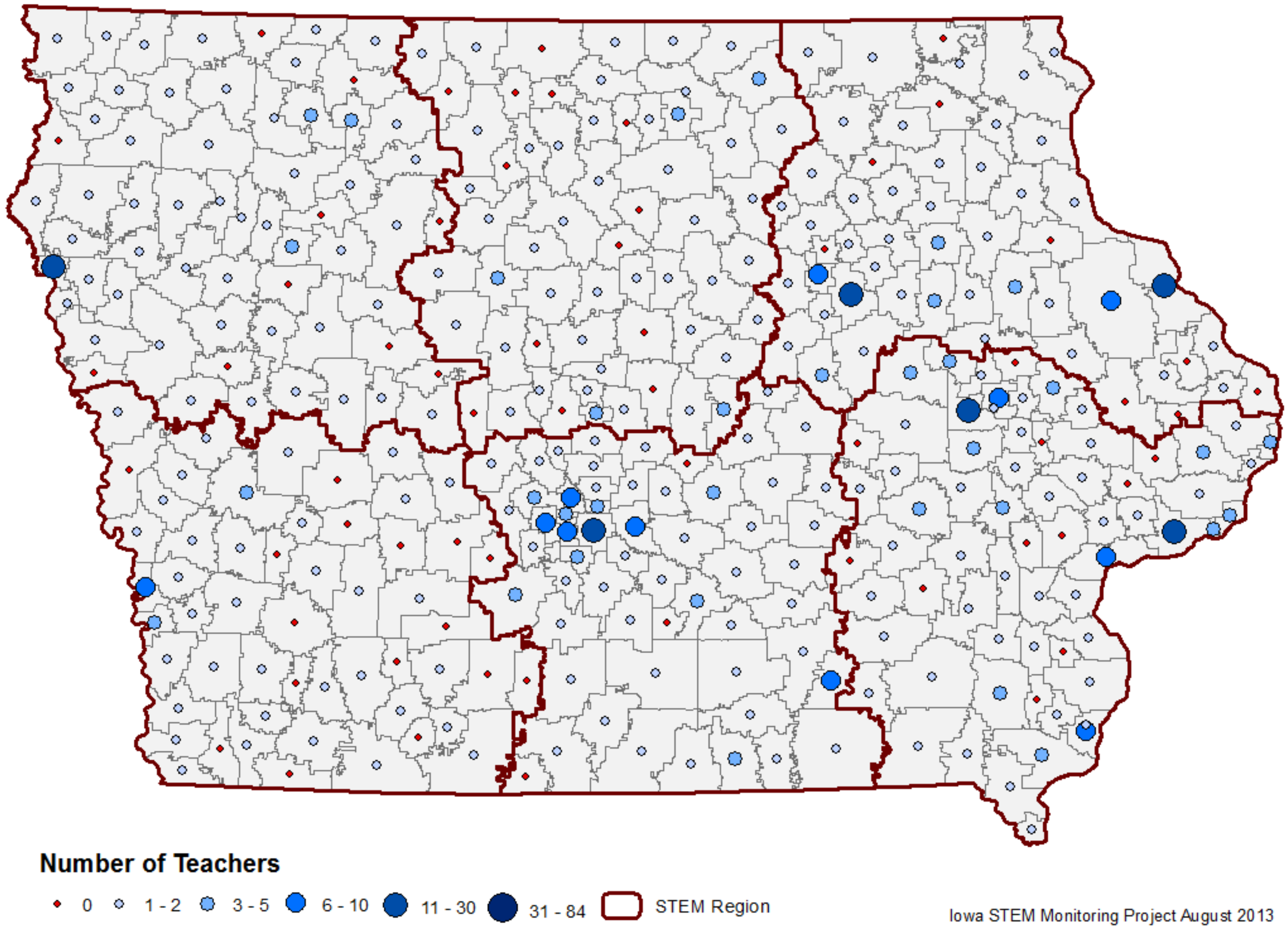
Iowa Teachers by District with Endorsements in Agriculture 2012-13



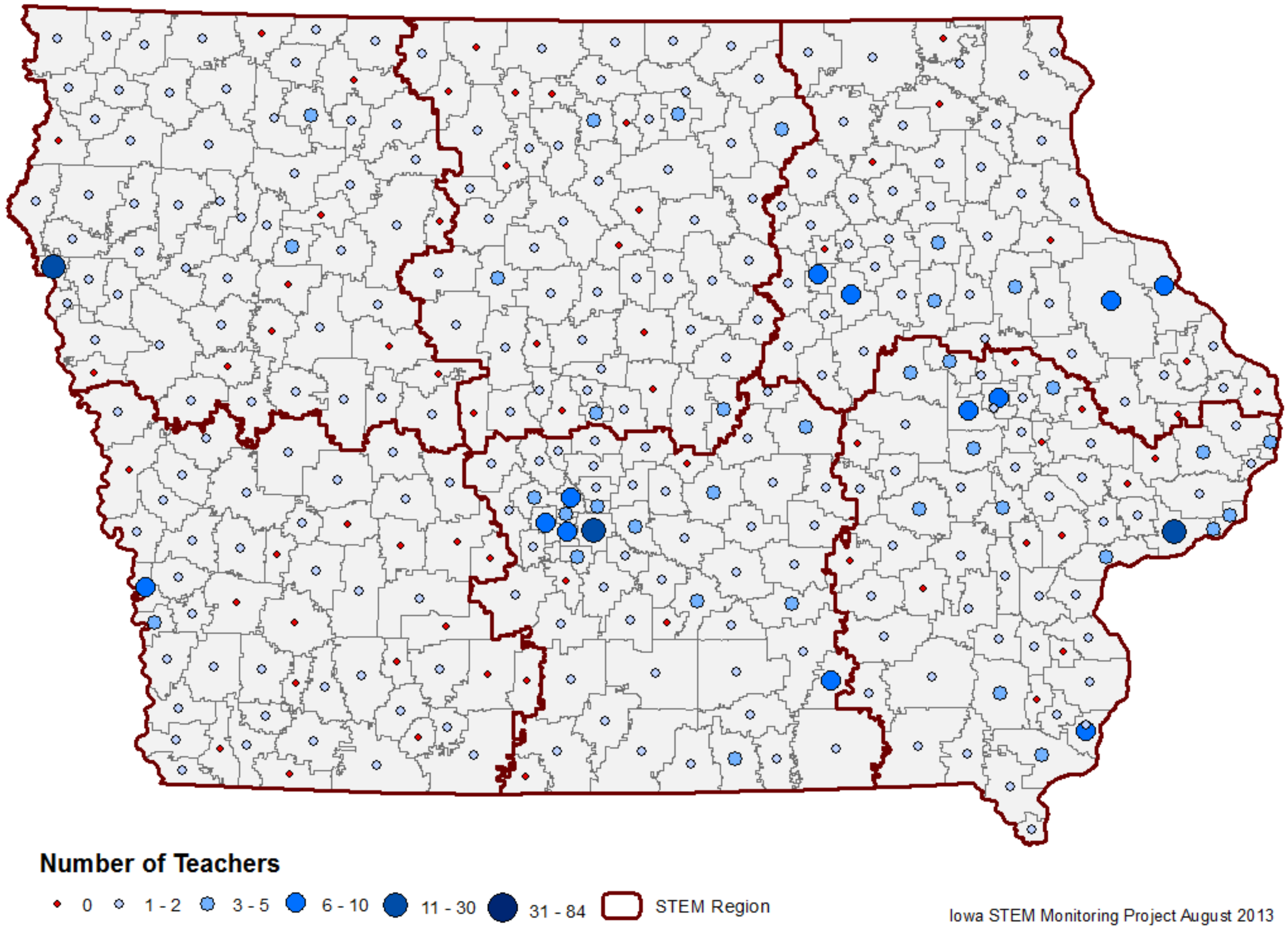
Iowa Teachers by District with Endorsements in Technology 2008-09



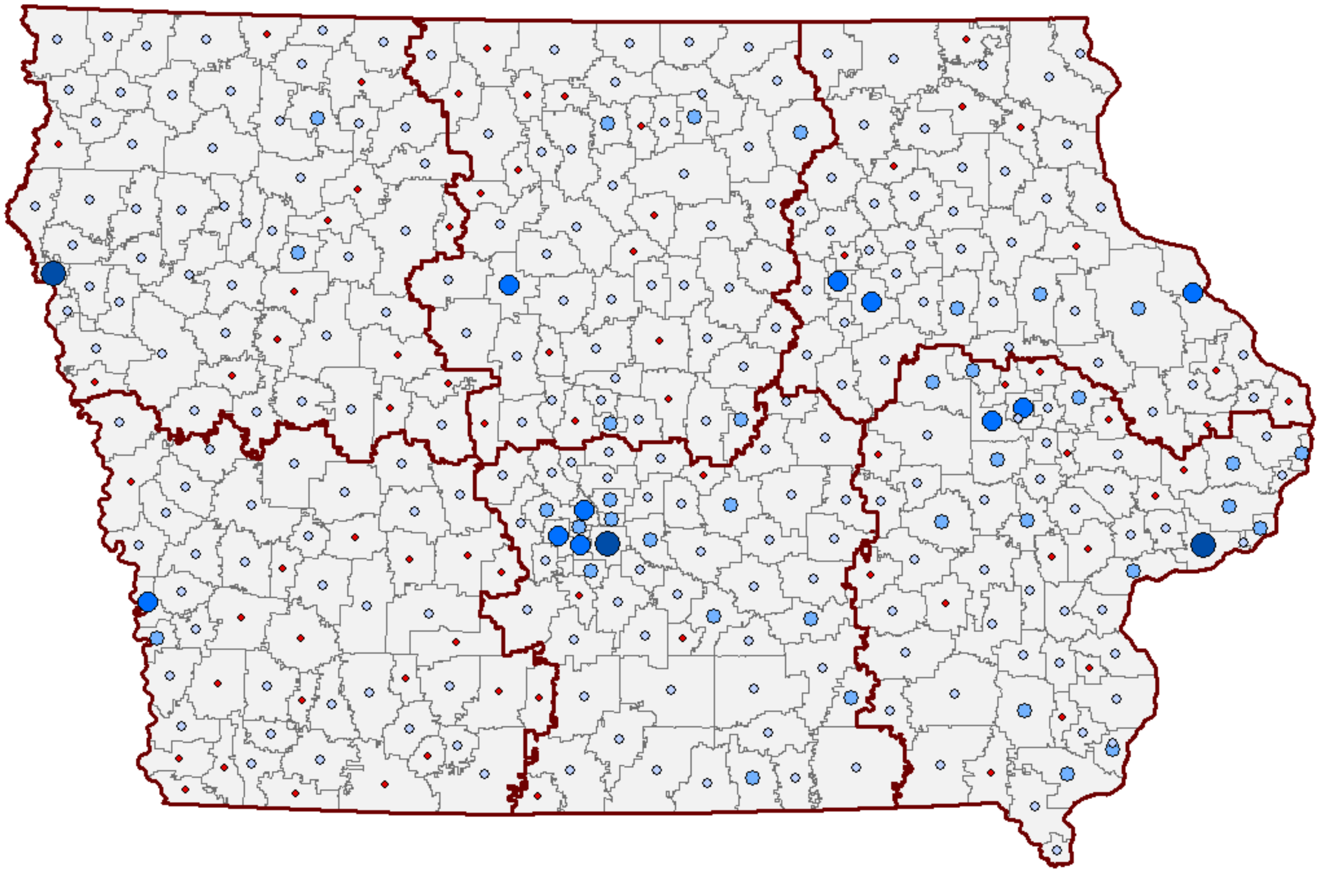
Iowa Teachers by District with Endorsements in Technology 2009-10



Iowa Teachers by District with Endorsements in Technology 2010-11



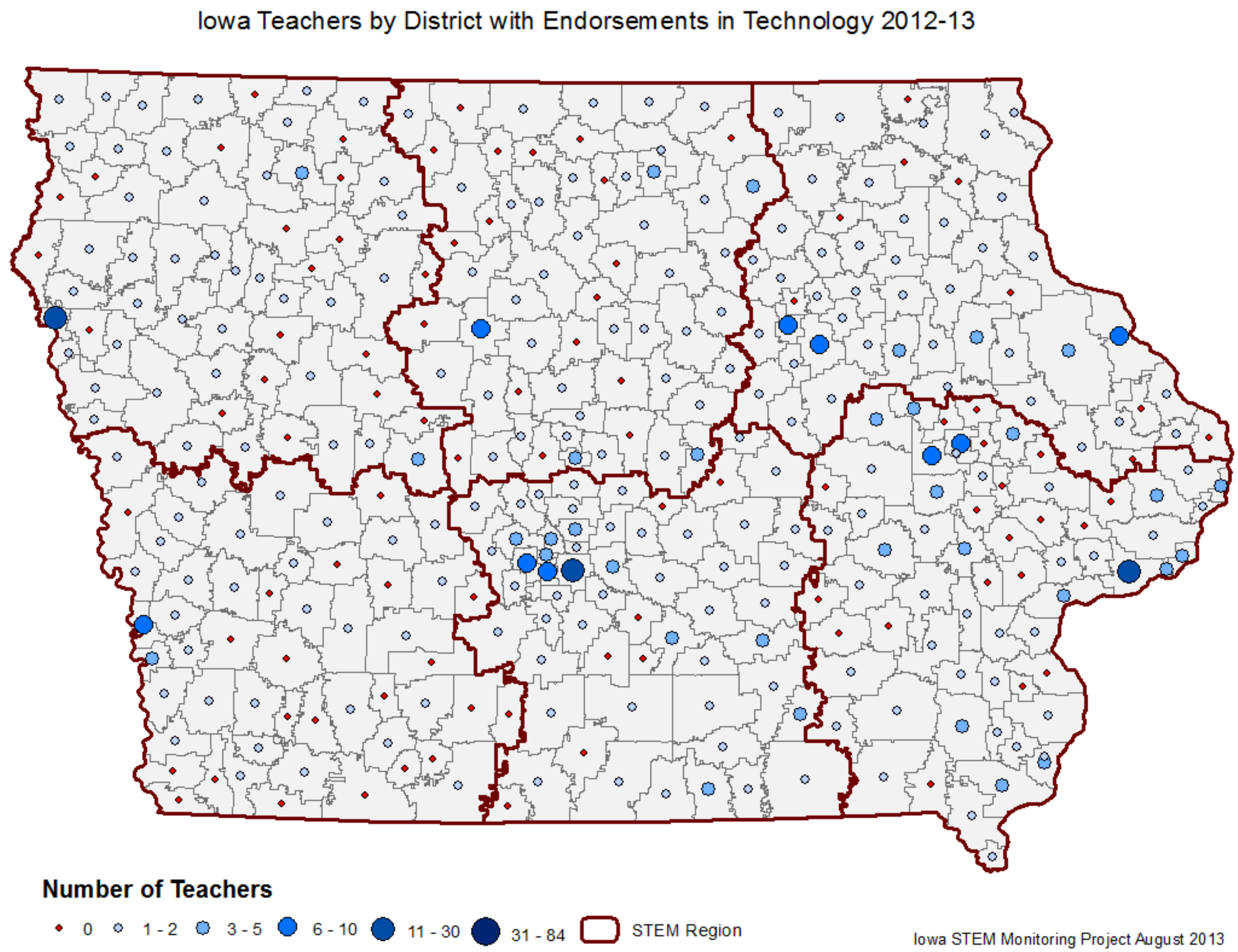
Iowa Teachers by District with Endorsements in Technology 2011-12



Number of Teachers

0 | 1 - 2 | 3 - 5 | 6 - 10 | 11 - 30 | 31 - 84 | STEM Region

Iowa STEM Monitoring Project August 2013


Iowa Teachers by District with Endorsements in Technology 2012-13
Number of Teachers
0
1 - 2
3 - 5
6 - 10
11 - 30
31 - 84
STEM Region
Iowa STEM Monitoring Project August 2013

Appendix E: Iowa school district mergers and consolidations since 2010

Table Appx.E.. Iowa school district mergers and consolidations since 2010

Original District Name(s)	Year of Merger/ Consolidation	New District Name
Linerville-Clio	2010	joined Wayne
South Clay (dissolved)	2010	Joined Sioux Central
Anita & C and M	2011	CAM
Deep River Millersberg	2011	joined English Valleys
Graettinger & Terril	2011	Graettinger-Terril
Allison-Bistrow & Greene	2011	North Butler
IKM & Manning	2011	IKM-Manning
Malvern & Nishna Valley	2011	East Mills School District
Nora Springs-Rock Falls & North Central	2011	Central Springs
Rockwell-Swaledale & Sheffield-Chapin	2011	West Fork
Sac & Wall Lake View Auburn	2011	East Sac
Anthon-Oto & Maple Valley	2012	Maple Valley-Anthon-Oto
Eddyville-Blakesburg & Fremont	2012	Eddyville-Blakesburg-Fremont
Palmer-Pomery	2012	joined Pocahontas Area
East Central & Preston	2013	Easton Valley
Woden-Crystal Lake	2013	joined Forest City

Appendix F: Statewide Survey of Public Attitudes Toward STEM_Questionnaire

To the correct respondent:

HELLO, my name is [YOUR NAME] and I am calling from the University of Northern Iowa. This is not a political call and we are not asking for money. Researchers here have been contracted by the state of Iowa to conduct a scientific study of math and science education in Iowa.

CONSENT

Your phone number has been chosen randomly, and I would like to ask some questions about math and science education in Iowa. We are interested in your views, regardless of how much you might know about the topic. Participation is voluntary and your responses are anonymous. For most people the interview takes about 10 to 15 minutes. I can provide the name and telephone number of the project manager if you have any questions about the study.

SECTION 1: Understanding/awareness of STEM and exposure to STEM topics

1. I'm going to read a short list of topics. Please tell me how much you have heard about each one in the past month.

    a. Traffic safety
    b. The Iowa economy
    c. Foreign policy
    d. Agriculture
    e. K-12 education
    f. The environment
    g. Healthcare

    Have you heard…

    1 A lot,
    2 A little, or
    3 Nothing in the past month?
    7 Don't know/Not sure
    9 Refused

2. I'm going to read a list of topics about education in Iowa. Please tell me how much you have heard about each one in the past month.

b. Requiring students to pass more rigorous tests before advancing to the next grade
d. Improving math, science, technology, and engineering education
f. Having tougher evaluation standards for teachers' performance
g. Raising teacher salaries
h. Homeschooling

Have you heard…

1 A lot,
2 A little, or
3 Nothing in the past month?
7 Don't know/Not sure
9 Refused

3. Have you visited each of the following in the past 12 months?

a.
b. A museum?
c. A zoo or aquarium?
d. A science or technology center?
e. A public library?
f. A K-12 school?
g. An arboretum or botanical center?

1 Yes
2 No
7 Don't know/Not sure
9 Refused

4a. You may have heard about STEM education or STEM careers lately. What, if anything, comes to mind when you hear the letters S-T-E-M, or the word STEM?

1 Open ended response
7 Don't know/Not sure
9 Refused

If respondent answered "science, technology, engineering, and math" to 4a; interview may select "1." To 4b without reading the question.

4b. STEM stands for "science, technology, engineering, and mathematics." Have you heard of this before?

1 Yes
2 No
7 Don't know/Not sure
9 Refused

4c. I'm going to read a short list of some groups promoting STEM education and careers. Please tell me how much you have heard about each one in the past year.

a. Corridor STEM Initiative
b. Iowa Governor's STEM Advisory Council
c. Iowa Student STEM Film Fest
d. STEM Connector

Have you heard…

1 A lot,
2 A little, or
3 Nothing in the past year?
7 Don't know/Not sure
9 Refused

SECTION 2: Attitudes Toward STEM and the Role of STEM in Iowa

5. There are several initiatives in Iowa to improve STEM education and STEM careers. The next questions are about your thoughts regarding these topics. I'm going to ask you questions about science, technology, engineering, and math. I will often refer to these using the abbreviation "STEM." Please tell me how strongly you agree or disagree with each of the following statements.

a. Science, technology, and engineering make our lives better.
d. Many more companies would move or expand to Iowa if the state had a reputation for workers with great science and math skills.
f. Increased focus on STEM education in Iowa will improve the state economy.
g. Advancements in science, technology, engineering and math will give more opportunities to the next generation.
h. There are more jobs available for people who have good math and science skills.
i. There should be more STEM jobs available for rural Iowans.
j. More should be done to increase the number of women working in science, technology, engineering, and math jobs.
k. More should be done to increase the number of Hispanics and African Americans working in STEM jobs.
l. More people would choose a STEM job if it didn't seem so hard.
m. It is important for people to understand what engineering contributes to society.
n. I cannot follow developments in science and technology because the speed of development is too fast.
o. There is an urgent need in Iowa for more resources to be put toward STEM education.
p. Science, technology, and engineering are too specialized for most people to understand it.

Do you…

1 Strongly agree,
2 Agree,
3 Agree/disagree, middle
4 Disagree, or
5 Strongly disagree?
7 Don't know/No opinion
9 Refused

6. As far as you know, compared to other states, where do you think Iowa ranks in students' standardized **math** scores?

Would you say…

1 Iowa is in the top third,
2 Iowa is near the middle, or
3 Iowa is in the bottom third?
7 Don't know/Not sure / 9 Refused

7. As far as you know, compared to other states, where do you think Iowa ranks in students' standardized **science** scores?

Would you say…

1 Iowa is in the top third,
2 Iowa is near the middle, or
3 Iowa is in the bottom third?
7 Don't know/Not sure
9 Refused

8. As far as you know, are there more than enough, not enough, or just the right number of skilled workers in Iowa to fill the available jobs in STEM areas?
Would you say there are…

1 More than enough workers to fill STEM jobs,
2 Not enough workers to fill STEM jobs, or
3 Just the right number of workers to fill STEM jobs?
7 Don't know/Not sure
9 Refused

SECTION 3: STEM Education

9. How well do you think the schools in your community are teaching each of the following subjects?

a. Mathematics
b. Science
c. Civics, history, and social studies
d. English
e. Engineering
f. Technology
g. Foreign languages
h. Art
i. Music

Would you say…

1 Excellent,
2 Good,
3 Fair, or
4 Poor?
7 Don't know/Not sure / 9 Refused

10. Do you think each of the following topics is absolutely essential, important but not essential or not important for all students to learn before graduating from high school?

    a. Basic math skills
    b. Basic scientific ideas and principles
    c. Advanced sciences such as physics
    d. Advanced math such as calculus
    e. Using technology to support learning
    f. Engineering and industrial technology principles and skills

    Would you say…

    1 Absolutely essential,
    2 Important but not essential, or
    3 Not important?
    7 Don’t know/Not sure
    9 Refused

11. Please tell me if the following three statements might explain why some students may do poorly in math and science. Just answer yes or no for each one.

    a There are not enough really good math and science teachers.
    b Students think the subject is not relevant to their lives.
    c Students think math and science are too hard to learn.

    1 Yes
    2 No
    7 Don't know/Not sure
    9 Refused

12. I’m going to read some statements about STEM education. Please tell me how strongly you agree or disagree with each one.

    a. It is more important for students to graduate from high school with strong skills in reading and writing than it is to have strong skills in math and science.
    b. Advanced math and science courses teach important critical thinking skills.
    c. Overall, the quality of STEM education in Iowa is high.
    d. Iowa colleges and universities are doing a good job preparing STEM teachers.
    e. Iowa colleges and universities are doing a good job preparing students for careers in STEM fields.
    f. Too few racial and ethnic minority students are encouraged to study STEM topics.

    Do you…

    1 Strongly agree,
    2 Agree,
    3 Agree/disagree, middle
    4 Disagree, or
    5 Strongly disagree?
    7 Don’t know/No opinion
    9 Refused

13. Please tell me how much each of the following strategies would improve math and science education. What if…

a. Businesses provided internships so high school students can gain practical job skills.
b. Students who are struggling with math or science were required to spend extra time after school or during the summer to catch up.
c. All high school students were required to take a science class that includes lab work.
d. We made sure that all Iowa students have the opportunity to take a full range of math courses.
e. Students were required to pass challenging tests in math and science in order to graduate from high school.
f. Fast learners were grouped together in one class and slower learners in another class.
h. We made sure that all Iowa students have the opportunity to take a full range of science courses.
i. Math and science teachers were paid more than other teachers.
j. Every school building had high-speed Internet access.
k. More hands-on science and technology activities were available to elementary students.

Would that make a…

1 Major improvement,
2 Moderate improvement, or
3 Little or no improvement?
7 Don't know/Not sure
9 Refused

SECTION 4: Child selection

14. How many children, if any, aged…
a. 0-3 live in your household?
b. 4-11 live in your household?
c. 12-19 live in your household?
[ ] = number of children
99 Refused [SKIP TO Q34]

If 14b AND 14c = 0, go to Q34
If 14b + 14c = 1, go to Q15
If 14b + 14c > 1, go to Q16

15. What is the age and gender of the child in your home?

[ ] **[SKIP TO Q17]**

16. In order to randomly select one child in your household as the focus of the next few education questions, please tell me the age and gender of all school aged children ages of 4 to 19 in your household, starting with the youngest.

Based on the information you provided, we are going to ask questions about the education of **[AGE/GENDER]**

17a. How are you related to **[CHILD]?**

Mother (birth/adoptive)	11
Father (birth/adoptive)	12
Step-mother	13
Step-father	14
Foster mother	15
Foster father	16
Brother	17
Sister	18
Grandmother	19
Grandfather	20
Aunt	21
Uncle	22
Cousin	23
Other relative	24
Non-relative guardian	25
Roommate, husband, wife, boy/girlfriend	26
Other **[SPECIFY]**	27
REFUSED	99

IF Q17a = 11-16 or 25, SKIP TO Q18a

17b. Are you a legal guardian of this child?

1 Yes
2 No **[SKIP TO Q34]**

8 Respondent is the child **[SKIP TO Q34]**
7 Don't know/Not sure **[SKIP TO Q34]**
9 Refused **[SKIP TO Q34]**

SECTION 5: Parent module

18a. Has this child started pre-school or school?

1 Yes
2 No **[SKIP TO Q34]**
7 Don't know/Not sure **[SKIP TO Q34]**
9 Refused **[SKIP TO Q34]**

18. Which of the following best describes this child's education situation?

This child…

1 Has been or will be attending a public school,
2 Has been or will be attending a private school,
3 Has been or will be attending a charter school,
4 Is home-schooled, or
5 Has graduated from high school or has their GED? **[SKIP TO Q34]**
7 Don't know/Not sure
9 Refused

18b. Has your child used, or have you used, the internet or a smart phone to help them complete their homework or school assignments?

1 Yes
2 No
7 Don't know/Not sure
9 Refused

18c. Does your child have a school-issued iPad, tablet, or laptop?

1 Yes
2 No
7 Don't know/Not sure
9 Refused

21. In general, how much interest does this child show in science, technology, engineering, and math topics?

Would you say…

1 A lot of interest,
2 Some interest, or
3 Little or no interest?
7 Don’t know/Not sure
9 Refused

22. How well is this child doing in these subjects?

Would you say…

1 Very well,
2 Ok, or
3 Not very well?
7 Don’t know/Not sure
9 Refused

23. How well is this child being prepared in these subjects by the school he or she attends?

Would you say…

1 Very well-prepared,
2 Somewhat prepared, or
3 Not well-prepared?
7 Don’t know/Not sure
9 Refused

23b. Thinking about the past school year and this summer, has your child participated, enrolled, or plan to enroll in any of the following activities?

a. day program or summer camp related to science, technology, engineering, or mathematics
b. after-school program for enriched learning about science, technology, engineering or mathematics
c. boy/girl scouts
d. 4-H
e. Any other structured activity related to science, technology, engineering or mathematics

1 Yes
2 No
7 Don't know/Not sure
9 Refused

If child is ages 4-11, skip to Q26

24. Which of the following do you think this child will most likely do after high school graduation?

Would you say…

1 Attend a 4-year college or university,
2 Attend a 2-year community college,
3 Attend a vocational or training school,
4 Enlist in the military,
5 Work, or
6 Something else [Specify:]?
7 Don’t know/Not sure
9 Refused

25. Do you think your child will pursue a career in a field related to science, technology, engineering, or math?

1 Yes
2 No
7 Don’t know/Not sure
9 Refused

28. How important is it that your child…

a. **does well in math.**
b. **does well in science.**
c. **has good technology skills.**
d. **has some exposure to engineering concepts.**

Is it…

1 Very important,
2 Somewhat important, or
3 Not very important?
7 Don’t know/No opinion
9 Refused

If child is ages 4-11, skip to Q31

30. How important is it that your child…

  a. **has some advanced math skills.**
  b. **has some advanced science skills.**
  c. **has some advanced technology skills.**
  d. **has some exposure to advanced engineering concepts.**

Is it…

1 Very important,
2 Somewhat important, or
3 Not very important?
7 Don’t know/No opinion
9 Refused

31. Is this child of Hispanic, Latino, or Spanish origin?

1 Yes
2 No
7 Don’t know/Not sure
9 Refused

32. Which one or more of the following would you say is the race of this child?

Would you say...

1 White
2 Black or African American
3 Asian
4 Native Hawaiian or Other Pacific Islander
5 American Indian or Alaska Native
Or
6 Other [specify]_______________
8 No additional choices
7 Don’t know / Not sure
9 Refused

33. Which one of these groups would you say best represents the race of this child?

1 White
2 Black or African American
3 Asian
4 Native Hawaiian or Other Pacific Islander
5 American Indian or Alaska Native
6 Other [specify]_______________
7 Don’t know / Not sure
9 Refused

SECTION 6: Demographics

34. Now I have just a few more background questions and we'll be finished. And you are…

1 Male?
2 Female?

35. What is your current age?

______ [range 18-96]

96 96 or older
97 Don't know/Not sure
99 Refused

36. What is the highest level of education you have completed?

1 Less than high school graduate
2 Grade 12 or GED (high school graduate)
3 One or more years of college but no degree
4 Associate's or other 2-year degree
5 College graduate with a 4 year degree such as a BA or BS
6 Graduate degree completed (MA, MS, MFA, MBA, MD, PhD, EdD, etc.)
7 Don't know/Not sure
9 Refused

37. Do you have a degree or some form of advanced training in a field related to science, technology, engineering, or math?

1 Yes
2 No
7 Don't know/Not sure
9 Refused

37a. In what subject or field was your degree or advanced training, if any?

[OPEN]

38. Which of the following best describes where you live? Do you live…

1 On a farm or in an open rural area,
2 In a small town of less than 5,000 people,
3 In a large town of 5,000 to less than 25,000 people,
4 In a city of 25,000 to less than 50,000 people, or
5 In a city of 50,000 or more people?
7 Don't know/Not sure
9 Refused

39. Are you currently…?

11 Employed for wages
12 Self-employed
13 Out of work for more than 1 year
14 Out of work for less than 1 year
15 A Homemaker
16 A Student
17 Retired
18 Unable to work
99 Refused

If 39=1, 2, 3, 4, or 7

40. Are you or were you recently employed in a career that significantly uses skills in science, technology, engineering, or math?

1 Yes
2 No
7 Don't know/Not sure
9 Refused

40a. What is, or was, your job?

[OPEN]

41. What is your annual gross household income from all sources before taxes?

Is it…

11 Less than $15,000,
12 $15,000 to less than $25,000,
13 $25,000 to less than $35,000,
14 $35,000 to less than $50,000,
15 $50,000 to less than $75,000,
16 $75,000 to less than $100,000,
17 $100,000 to less than $150,000, or
18 $150,000 or more?
77 Don't know/Not sure
99 Refused

If Q41 < 77, skip to 42

41b. Can you tell me if your annual gross household income is less than, equal to, or greater than $50,000?

1 Less than $50,000
2 Equal to $50,000
3 More than $50,000
7 Don't know/Not sure
9 Refused

42. Are you of Hispanic, Latino, or Spanish origin?

1 Yes
2 No
7 Don’t know/Not sure
9 Refused

43. Which one or more of the following would you say is your race?

Would you say...

1 White
2 Black or African American
3 Asian
4 Native Hawaiian or Other Pacific Islander
5 American Indian or Alaska Native
Or
6 Other [specify]______________

8 No additional choices
7 Don’t know / Not sure
9 Refused

If more than one response to Q43; continue. Otherwise, go to Q46.

44. Which one of these groups would you say best represents your race?

1 White
2 Black or African American
3 Asian
4 Native Hawaiian or Other Pacific Islander
5 American Indian or Alaska Native
6 Other [specify]______________
7 Don’t know / Not sure
9 Refused

46. What county do you live in?

_____________ County

47. What is your ZIP Code?

[ ]
77777. Don’t know/Not sure
99999. Refused

48a. Can you also be reached via cell phone?

1 YES
2 NO
7 Don’t know /Not sure
9 Refused

[If talking to respondent on landline, skip to 49]

48b. Does the house you live in also have a landline telephone?

1 YES
2 NO
7 Don’t know /Not sure
9 Refused

[If 48a or 48b = 2, skip to REMARKS]

49. Thinking about all the phone calls that you receive on your landline and cell phone, what percent, between 0 and 100, are received on your cell phone?

_ _ _ Enter percent (1 to 100)
8 8 8 Zero
7 7 7 Don’t know / Not sure
9 9 9 Refused

7 Don’t know/Not sure
9 Refused

REMARKS

Is there anything else that you would like to say about STEM in Iowa?
[OPEN]

CLOSING STATEMENT

That is my last question. Everyone’s answers will be combined to give us information about the opinions of people in Iowa. Thank you very much for your time and help with this study.

Appendix G: Statewide Survey of Public Attitudes Toward STEM_Technical notes

AAPOR Outcome Rate Calculator Version 3.1 November, 2010	STEM 1 Landline 2013	STEM 2 Cell 2013	STEM 3 Parents 2013	STEM 4 Hispanic 2013	STEM Overall 2013
Interview (Category 1)					
Complete	610	652	407	204	1873
Partial					0
Eligible, non-interview (Category 2)					0
Refusal and breakoff	11	18	7	25	61
Household-level refusal	65	22	56	25	168
Known-respondent refusal	245	121	111	65	542
Break off/ Implicit refusal (internet surveys)	10	13	4	13	40
Respondent never available	234	46	289	139	708
Telephone answering device (confirming HH)	66		72	7	145
Deceased respondent	1	1		2	4
Physically or mentally unable/incompetent	50	9	11	20	90
Household-level language problem	3	9	2	14	28
Respondent language problem	1	9		4	14
Unknown if housing unit/unknown about address	537	1175	301	218	2231
Not attempted or worked/not mailed/No invitation sent (internet surveys)					0
Always busy	44	30	6	5	85
No answer	479	8	110	70	667
Answering machine-don't know if household	413	632	342	122	1509
Technical phone problems	3	1	2	1	7
Housing unit, unknown if eligible respondent	162	19	118	65	364
Other - Center Do Not Call List	128	255	104	24	511
Returned from an unsampled email address (internet surveys)					0
Not eligible (Category 4)					0
Out of sample - other strata than originally coded	5	134	1		140
					0
Fax/data line	214	1	17	3	235
					0
Non-working/disconnect	1623	834	249	358	3064
Nonresidence	224	199	22	11	456
No eligible respondent	10	161	8	3	182

	STEM 1	STEM 2	STEM 3	STEM 4	STEM
AAPOR Outcome Rate Calculator	**Landline**	**Cell**	**Parents**	**Hispanic**	**Overall**
Version 3.1 November, 2010	**2013**	**2013**	**2013**	**2013**	**2013**
Total phone numbers used	5138	4349	2239	1398	13124
I=Complete Interviews (1.1)	610	652	407	204	1873
P=Partial Interviews (1.2)	0	0	0	0	0
R=Refusal and break off (2.1)	331	174	178	128	811
NC=Non Contact (2.2)	300	46	361	146	853
O=Other (2.0, 2.3)	55	28	13	40	136
Calculating e: e is the estimated proportion of cases of unknown eligibility that are eligible. Enter a different value or accept the estimate in this line as a default. This estimate is based on the proportion of eligible units among all units in the sample for which a definitive determination of status was obtained (a conservative estimate). This will be used if you do not enter a different estimate. For guidance about how to compute other estimates of e, see AAPOR's 2009 *Eligibility Estimates.*	0.384342	0.403769	0.763535	0.580067	0.473935
UH=Unknown Household (3.1)	1476	1846	761	416	4499
UO=Unknown other (3.2-3.9)	290	274	222	89	875
Response Rate 1					
I/(I+P) + (R+NC+O) + (UH+UO)	0.199216	0.215894	0.209578	0.199413	0.20703
Response Rate 2					
(I+P)/(I+P) + (R+NC+O) + (UH+UO)	0.199216	0.215894	0.209578	0.199413	0.20703
Response Rate 3					
I/((I+P) + (R+NC+O) + e(UH+UO))	0.3089	0.371301	0.238074	0.251562	0.301129
Response Rate 4					
(I+P)/((I+P) + (R+NC+O) + e(UH+UO))	0.3089	0.371301	0.238074	0.251562	0.301129
Cooperation Rate 1					
I/(I+P)+R+O)	0.61245	0.763466	0.680602	0.548387	0.664184
Cooperation Rate 2					
(I+P)/((I+P)+R+0))	0.61245	0.763466	0.680602	0.548387	0.664184
Cooperation Rate 3					
I/((I+P)+R))	0.648247	0.789346	0.695726	0.614458	0.697839
Cooperation Rate 4					
(I+P)/((I+P)+R))	0.648247	0.789346	0.695726	0.614458	0.697839
Refusal Rate 1					
R/((I+P)+(R+NC+O) + UH + UO))	0.108099	0.057616	0.091658	0.125122	0.089643
Refusal Rate 2					
R/((I+P)+(R+NC+O) + e(UH + UO))	0.167616	0.099089	0.104121	0.157843	0.130387
Refusal Rate 3					
R/((I+P)+(R+NC+O))	0.255401	0.193333	0.18561	0.247104	0.2208

	STEM 1	STEM 2	STEM 3	STEM 4	STEM
AAPOR Outcome Rate Calculator	**Landline**	**Cell**	**Parents**	**Hispanic**	**Overall**
Version 3.1 November, 2010	**2013**	**2013**	**2013**	**2013**	**2013**
Contact Rate 1					
(I+P)+R+O / (I+P)+R+O+NC+ (UH + UO)	0.325278	0.282781	0.30793	0.363636	0.311706
Contact Rate 2					
(I+P)+R+O / (I+P)+R+O+NC + e(UH+UO)	0.504368	0.486336	0.349799	0.45873	0.453381
Contact Rate 3					
(I+P)+R+O / (I+P)+R+O+NC	0.768519	0.948889	0.623566	0.718147	0.767765

Notes and general directions:

Data in the gold columns are examples from a real RDD survey; you can enter your final disposition results in the other columns. Each sampled element in the sample should be assigned a single, final disposition code (e.g., complete, 1.1, or language problem, 2.33).
Enter the total for each of the codes in their appropriate cells in the straw or blue-colored column.

Final disposition codes are mutually exclusive and are constructed to capture fine levels of detail.

Two examples are helpful: If you know only that the interview was refused in an eligible household,

but nothing else about the call in an RDD survey, the outcome could be coded 2.11; if the interview was refused in

an eligible household by a known respondent, then it could be coded 2.112. If a more precise code is used, the outcome would not be entered in a higher-level code. E.g., once coded 2.112, a final disposition would not appear in both 2.0 and 2.112.
More specific directions for classifying final dispositions for outcomes are in the published version of *Standard Definitions*.

AAPOR's Standard Definitions Committee recognizes that there are some minor inconsistencies in outcome code labeling between this version and earlier versions. Those inconsistencies do not affect outcome rate calculations and will be addressed in the next version of *Standard Definitions*. Version 3.1 corrects the calculation for "e" in V. 3.0.

About the calculator

This calculator was developed as a service to the research industry and survey research profession by AAPOR's Standard Definitions Committee.
Rob Daves lead a team that designed the original calculator, which also benefitted from Tom Smith's contributions; Daves rewrote this version
to take additions to *Standard Definitions* into account. Questions or suggestions should be addressed to standards@aapor.org.

WEIGHTING METHODOLOGY REPORT
IOWA STEM SURVEY – 2013

Design Overview:

This study has secured a total of 1,872 interviews with adults 18 or older residing in Iowa. In order to provide a probability-based sample representative of all adults in Iowa, a dual-frame random digit dial (RDD) sampling methodology was use, whereby both landline and cellular telephone numbers were included in the sample. Moreover, listed households expected to include children 4 to 11 and 12 to 19, as well as Hispanic and African American households were oversampled to reduce screening costs. The following table provides a summary of completed interviews by sampling strata.

Stratum	Respondents	
1. Landline RDD	610	32.6%
2. Cellular RDD	652	34.8%
3. Listed Landline Households with 4 to 11 Year Olds	257	13.7%
4. Listed Landline Households with 12 to 19 Year Olds	150	8.0%
5. Block Groups with at Least 40% African Americans	93	5.0%
6. Listed Landline Households with Hispanic Surname	110	5.9%
Total	**1,872**	**100.0%**

Table 1. Distribution of completed interviews by sampling strata

Weighting:

Virtually, all survey data are weighted before they can be used to produce reliable estimates of population parameters. While reflecting the selection probabilities of sampled units, weighting also attempts to compensate for practical limitations of a sample survey, such as differential nonresponse and undercoverage. The weighting process for this survey essentially entailed two major steps. The first step consisted of computation of *base weights* to reflect unequal selection probabilities for different sampling strata, increased chance of selection for adults with both landline and cell phones, and selection of one adult per household. In the second step, base weights were adjusted so that the resulting final weights aggregate to reported totals for the target population.

For the second step, weights were adjusted (raked) simultaneously along several dimensions using the *WgtAdjust* procedure of SUDAAN. The needed population totals for weighting have been obtained from the August 2013 Current Population Survey (CPS). It should be noted that survey data for a number of demographic questions, such as race, age, and education, included missing values. All such missing values were first imputed using a *hot-deck* procedure before construction of the survey weights. As such, respondent counts reflected in the following tables correspond to the post-imputation step.

Table 2. First raking dimension for weight adjustments by gender and age

Age	Males				Females			
	Respondents		Population		Respondents		Population	
18-24	73	9.6%	152,811	13.5%	51	4.6%	140,016	11.9%
25-34	73	9.6%	203,298	17.9%	98	8.8%	200,572	17.0%
35-44	141	18.5%	169,165	14.9%	211	19.0%	172,664	14.7%
45-54	151	19.8%	196,493	17.3%	232	20.9%	187,241	15.9%
55-64	142	18.6%	213,690	18.9%	213	19.2%	221,368	18.8%
65+	184	24.1%	197,266	17.4%	303	27.3%	256,445	21.8%
Total	**764**	**100.0%**	**1,132,723**	**100.0%**	**1,108**	**100.0%**	**1,178,306**	**100.0%**

Table 3. Second raking dimension for weight adjustments by gender and ethnicity

Ethnicity	Males				Females			
	Respondents		Population		Respondents		Population	
Hispanic	43	5.6%	47,728	4.2%	73	6.6%	53,819	4.6%
Others	721	94.4%	1,084,995	95.8%	1,035	93.4%	1,124,487	95.4%
Total	**764**	**100.0%**	**1,132,723**	**100.0%**	**1,108**	**100.0%**	**1,178,306**	**100.0%**

Table 4. Third raking dimension for weight adjustments by race

Race	Respondents		Population	
White	1,776	94.9%	2,162,130	93.6%
African American	82	4.4%	60,298	2.6%
Others	14	0.7%	88,601	3.8%
Total	**1,872**	**100.0%**	**2,311,029**	**100.0%**

Table 5. Fourth raking dimension for weight adjustments by gender and education

Education	Males				Females			
	Respondents		Population		Respondents		Population	
Less than high school	29	3.8%	86,123	7.6%	54	4.9%	70,326	6.0%
High School or GED	212	27.7%	357,794	31.6%	275	24.8%	372,257	31.6%
College 1 year to 3 years	217	28.4%	362,857	32.0%	334	30.1%	391,084	33.2%
College 4 year or more	194	25.4%	240,224	21.2%	302	27.3%	245,175	20.8%
Graduate degree	112	14.7%	85,725	7.6%	143	12.9%	99,464	8.4%
Total	**764**	**100.0%**	**1,132,723**	**100.0%**	**1,108**	**100.0%**	**1,178,306**	**100.0%**

Table 6. Fifth raking dimension for weight adjustments by gender and place of residence

Place	Males				Females			
	Respondents		Population		Respondents		Population	
Farm	169	22.1%	245,526	21.7%	239	21.6%	226,677	19.2%
Small Town	188	24.6%	236,541	20.9%	276	24.9%	256,371	21.8%
Large Town	115	15.1%	210,952	18.6%	209	18.9%	227,839	19.3%
Small City	81	10.6%	108,301	9.6%	120	10.8%	118,394	10.0%
Large City	211	27.6%	331,403	29.3%	264	23.8%	349,025	29.6%
Total	**764**	**100.0%**	**1,132,723**	**100.0%**	**1,108**	**100.0%**	**1,178,306**	**100.0%**

Table 7. Sixth raking dimension for weight adjustments by telephone status

Telephone Status	Respondents		Population	
Cell-only	319	17.0%	559,269	24.2%
Others	1,553	83.0%	1,751,760	75.8%
Total	**1,872**	**100.0%**	**2,311,029**	**100.0%**

Variance Estimation for Weighted Data:

Survey estimates can only be interpreted properly in light of their associated sampling errors. Since weighting often increases variances of estimates, use of standard variance calculation formulae with weighted data can result in misleading statistical inferences. With weighted data, two general approaches for variance estimation can be distinguished. One method is *Taylor Series linearization* and the second is *replication*. There are several statistical software packages that can be used to produce design-proper estimates of variances using linearization or replication methodologies, including:

- SAS: http://www.sas.com
- SUDAAN: http://www.rti.org/sudaan
- WesVar: http://www.westat.com/westat/statistical_software/wesVar
- Stata: http://www.stata.com

An Approximation Method for Variance Estimation can be used to avoid the need for special software packages. Researchers who do not have access to such tools for design-proper estimation of standard errors can approximate the resulting variance inflation due to weighting and incorporate that in subsequent calculations of confidence intervals and tests of significance. With w_i representing the final weight of the i^{th} respondent, the inflation due to weighting, which is commonly referred to as *Design Effect*, can be approximated by:

$$\delta = 1 + \frac{\sum_{i=1}^{n} \frac{(w_i - \bar{w})^2}{n-1}}{\bar{w}^2}$$

For calculation of a confidence interval for an estimated percentage, $\hat{p}$, one can obtain the conventional variance of the given percentage $S^2(\hat{p})$, multiply it by the approximated design effect, δ, and use the resulting quantity as adjusted variance. That is, the adjusted variance $\hat{S}^2(\hat{p})$ would be given by:

$$\hat{S}^2(\hat{p}) \approx \frac{\hat{p}(1-\hat{p})}{n-1}\left(\frac{N-n}{N}\right) \times \delta$$

Subsequently, the (100-α) percent confidence interval for P would be given by:

$$\hat{p} - z_{\alpha/2}\sqrt{\frac{\hat{p}(1-\hat{p})}{n-1}\left(\frac{N-n}{N}\right) \times \delta} \leq P \leq \hat{p} + z_{\alpha/2}\sqrt{\frac{\hat{p}(1-\hat{p})}{n-1}\left(\frac{N-n}{N}\right) \times \delta}$$

Appendix H: Statewide Survey of Public Attitudes Toward STEM_Item frequencies

*p<0.05 **p<0.01

Q1. Please tell me how much you have heard about each one in the past month.														
	Total			Gender		Education			Parent Status			Location		
Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
a. Traffic Safety														
A lot	444	519,289	22.5%	22.1%	22.9%	25.0%	22.4%	19.4%	24.1%	16.0%	20.4%	20.9%	23.3%	23.0%
A little	975	1,181,477	51.2%	52.0%	50.3%	47.3%	51.3%	55.7%	50.6%	52.8%	52.4%	52.4%	49.5%	52.7%
Nothing	450	607,909	26.3%	25.9%	26.8%	27.7%	26.2%	24.9%	25.3%	31.2%	27.2%	26.7%	27.2%	24.3%
Total	1,869	2,308,676												
b. The Iowa Economy										**				
A lot	779	888,914	38.5%	36.1%	40.8%	38.7%	33.7%	43.8%	42.2%	26.9%	30.7%	39.2%	41.1%	35.6%
A little	877	1,097,176	47.5%	51.5%	43.6%	45.4%	53.6%	43.7%	44.7%	57.6%	52.4%	48.2%	45.5%	47.0%
Nothing	215	324,099	14.0%	12.4%	15.6%	15.9%	12.7%	12.5%	13.1%	15.4%	16.9%	12.6%	13.4%	17.4%
Total	1,871	2,310,189												
c. Foreign Policy							**			**				
A lot	918	1,048,336	45.6%	49.0%	42.3%	35.4%	49.6%	54.6%	49.3%	34.9%	37.2%	42.1%	44.7%	51.5%
A little	675	844,171	36.7%	35.5%	37.8%	37.1%	34.9%	37.7%	35.7%	39.1%	39.4%	38.8%	37.7%	32.5%
Nothing	276	407,658	17.7%	15.4%	19.9%	27.5%	15.5%	7.6%	15.0%	26.1%	23.3%	19.1%	17.5%	15.9%
Total	1,869	2,300,165												
d. Agriculture				**			**						**	
A lot	1,000	1,168,776	50.6%	54.4%	47.0%	46.5%	51.4%	55.5%	52.5%	45.5%	46.4%	60.7%	44.4%	43.1%
A little	695	900,419	39.0%	38.5%	39.5%	38.8%	38.7%	39.1%	38.9%	38.7%	39.7%	32.1%	45.6%	42.5%
Nothing	175	239,399	10.4%	7.2%	13.5%	14.7%	9.9%	5.3%	8.7%	15.8%	13.9%	7.2%	10.0%	14.4%
Total	1,870	2,308,595												
e. K-12 Education				**			**			**			*	
A lot	622	609,084	26.4%	20.5%	32.1%	23.7%	23.2%	33.8%	22.4%	38.0%	35.5%	27.2%	31.5%	20.4%
A little	931	1,247,486	54.1%	58.5%	49.8%	52.5%	56.4%	53.2%	57.0%	47.4%	46.2%	53.0%	51.0%	57.8%
Nothing	317	450,906	19.5%	21.0%	18.1%	23.8%	20.4%	13.0%	20.7%	14.6%	18.3%	19.8%	17.5%	21.8%
Total	1870	2,307,476												

Q1. Please tell me how much you have heard about each one in the past month.														
	Total			Gender		Education			Parent Status			Location		
Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
f. The Environment										*				
A lot	639	742,969	32.2%	31.3%	33.1%	29.0%	32.2%	36.6%	34.6%	24.7%	27.2%	30.1%	32.7%	34.9%
A little	987	1,244,790	53.9%	54.2%	53.7%	54.7%	54.1%	53.0%	53.2%	58.6%	53.7%	54.5%	51.4%	54.8%
Nothing	244	320,531	13.9%	14.6%	13.2%	16.2%	13.7%	10.4%	12.2%	16.7%	19.0%	15.4%	16.0%	10.3%
Total	1,870	2,308,291												
g. Healthcare							**			*				
A lot	1,301	1,545,549	66.9%	65.3%	68.4%	59.3%	70.4%	73.4%	69.5%	62.9%	58.2%	65.6%	62.3%	74.5%
A little	471	597,241	25.8%	26.7%	25.0%	31.3%	23.0%	21.9%	23.8%	25.9%	34.8%	27.7%	27.8%	19.6%
Nothing	100	168,239	7.3%	8.1%	6.5%	9.4%	6.5%	4.7%	6.7%	11.1%	7.0%	6.7%	9.9%	5.9%
Total	1,872	2,311,029												

Q2. Please tell me about how much you have heard about each education in Iowa topic in the past month														
	Total			Gender		Education			Parent Status			Location		
Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
a. Requiring students to pass more rigorous tests before advancing to the next grade														
							**							
A lot	239	270,071	11.7%	10.9%	12.5%	13.2%	7.5%	14.5%	11.2%	9.6%	15.6%	11.2%	12.8%	11.7%
A little	674	785,615	34.0%	33.2%	34.8%	29.9%	32.5%	41.4%	35.8%	29.0%	29.8%	33.9%	32.1%	36.6%
Nothing	956	1,253,730	54.3%	56.0%	52.7%	56.9%	60.0%	44.0%	53.0%	61.4%	54.7%	54.9%	55.1%	51.8%
Don't know	1	333	.0%	0.0%	.0%	.0%	0.0%	0.0%	.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Not Sure	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	1,870	2,309,750												
b. Improving math, science, technology, and engineering education														
							**							
A lot	441	465,780	20.2%	18.6%	21.7%	17.1%	13.7%	31.7%	19.7%	20.7%	22.1%	20.6%	20.6%	19.5%
A little	778	945,477	41.0%	40.6%	41.3%	44.7%	39.5%	38.0%	41.7%	38.9%	39.3%	42.5%	42.8%	36.0%
Nothing	648	896,396	38.8%	40.9%	36.9%	38.1%	46.8%	30.3%	38.7%	40.4%	38.6%	36.9%	36.6%	44.5%
Total	1,867	2,307,654												
c. Having tougher evaluation standards for teachers' performance														
					*		**			**				
A lot	437	475,892	20.6%	17.6%	23.6%	14.0%	17.2%	33.4%	22.1%	14.5%	18.8%	18.9%	21.8%	23.0%
A little	824	1,021,752	44.3%	48.7%	40.1%	49.8%	42.5%	39.5%	46.1%	40.7%	39.3%	41.7%	44.1%	46.6%
Nothing	607	807,549	35.0%	33.7%	36.3%	36.2%	40.3%	27.1%	31.8%	44.8%	41.9%	39.4%	34.1%	30.4%
Total	1,868	2,305,194												
d. Raising teacher salaries														
							*			**				
A lot	344	401,515	17.4%	16.7%	18.1%	17.9%	16.1%	18.3%	18.7%	12.6%	15.0%	16.9%	17.2%	18.5%
A little	893	1,086,907	47.1%	50.4%	43.8%	42.9%	45.6%	53.8%	49.4%	39.3%	42.6%	44.6%	51.2%	48.0%
Nothing	631	820,571	35.5%	32.9%	38.1%	39.2%	38.3%	27.9%	31.9%	48.1%	42.4%	38.5%	31.6%	33.4%
Total	1,868	2,308,994												

e. Homeschooling							*								
A lot	229	245,891	10.6%	8.7%	12.5%	11.6%	8.7%	11.5%	9.6%	13.6%	13.0%	9.5%	12.0%	10.6%
A little	698	822,195	35.6%	36.0%	35.2%	28.8%	36.5%	43.1%	36.8%	29.9%	34.4%	34.8%	33.4%	38.5%
Nothing	943	1,241,465	53.7%	55.3%	52.2%	59.4%	54.8%	45.4%	53.5%	56.5%	52.6%	55.5%	54.5%	51.0%
Don't know	1	184	.0%	0.0%	.0%	.0%	0.0%	0.0%	0.0%	0.0%	.0%	.0%	0.0%	0.0%
Not Sure	1	1,294	.1%	0.0%	.1%	.1%	0.0%	0.0%	.1%	0.0%	0.0%	.1%	0.0%	0.0%
Total	1,872	2,311,029												

Q3. Have you visited each of the following in the past 12 months

	Total			Gender		Education			Parent Status			Location		
Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
a. A museum							**			**				**
Yes	849	968,037	41.9%	39.2%	44.5%	26.8%	38.2%	66.4%	38.8%	53.7%	47.1%	35.6%	43.4%	48.4%
No	1,021	1,341,806	58.1%	60.8%	55.5%	73.2%	61.8%	33.6%	61.2%	46.3%	52.9%	64.4%	56.6%	51.6%
Total	1,870	2,309,843												
b. A zoo or an aquarium							**			**				**
Yes	722	911,051	39.4%	39.1%	39.7%	29.7%	38.6%	53.5%	34.9%	64.5%	40.8%	30.9%	42.6%	47.9%
No	1,150	1,399,978	60.6%	60.9%	60.3%	70.3%	61.4%	46.5%	65.1%	35.5%	59.2%	69.1%	57.4%	52.1%
Total	1,872	2,311,029												
c. A science or technology center							**			**				
Yes	557	618,316	26.8%	28.0%	25.6%	17.8%	25.5%	40.3%	23.4%	42.3%	30.1%	23.9%	29.3%	29.3%
No	1,314	1,689,879	73.2%	72.0%	74.4%	82.2%	74.5%	59.7%	76.6%	57.7%	69.9%	76.1%	70.7%	70.7%
Total	1,871	2,308,195												
d. A public library					**		**			**				
Yes	1,295	1,511,188	65.4%	59.1%	71.4%	57.9%	60.9%	80.9%	61.8%	76.4%	73.0%	63.8%	66.6%	67.7%
No	577	799,841	34.6%	40.9%	28.6%	42.1%	39.1%	19.1%	38.2%	23.6%	27.0%	36.2%	33.4%	32.3%
Total	1,872	2,311,029												
e. A K-12 school							*			**				**
Yes	1,220	1,291,283	55.9%	52.6%	59.0%	50.8%	57.1%	61.6%	42.8%	90.1%	88.0%	62.5%	55.2%	47.1%
No	652	1,019,746	44.1%	47.4%	41.0%	49.2%	42.9%	38.4%	57.2%	9.9%	12.0%	37.5%	44.8%	52.9%
Total	1,872	2,311,029												
f. An arboretum or botanical center							**							
Yes	397	462,385	20.0%	17.9%	22.1%	14.5%	18.8%	28.8%	19.1%	25.1%	20.5%	18.4%	18.0%	24.3%
No	1,474	1,848,014	80.0%	82.1%	77.9%	85.5%	81.2%	71.2%	80.9%	74.9%	79.5%	81.6%	82.0%	75.7%
Total	1,871	2,310,399												

Q4. STEM stands for "science, technology, engineering, and mathematics." Have you heard of this before?
******

	Total			Gender		Education			Parent Status			Location		
	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
Yes	867	950,823	41.2%	43.0%	39.6%	32.6%	37.4%	57.4%	41.5%	37.3%	43.0%	39.5%	39.9%	45.4%
No	999	1,354,901	58.8%	57.0%	60.4%	67.4%	62.6%	42.6%	58.5%	62.7%	57.0%	60.5%	60.1%	54.6%
Total	1,866	2,305,725												

Q4b. I'm going to read a short list of some groups promoting STEM education and careers. How much have you heard about….?														
	Total			Gender		Education			Parent Status			Location		
Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
a. Corridor STEM Initiative							*							
A lot	40	42,723	1.8%	1.8%	1.9%	1.1%	1.7%	3.0%	2.0%	1.0%	1.6%	1.8%	1.7%	2.2%
A little	275	270,072	11.7%	12.7%	10.7%	9.4%	11.3%	15.2%	12.2%	9.3%	11.4%	11.6%	13.2%	9.9%
Nothing	1,553	1,996,818	86.5%	85.6%	87.3%	89.5%	87.0%	81.8%	85.8%	89.6%	87.0%	86.6%	85.1%	87.9%
Total	1,868	2,309,613												
b. Iowa Governor's STEM Advisory Council							*			*				
A lot	102	96,095	4.2%	3.6%	4.7%	3.4%	1.9%	7.8%	3.8%	5.3%	4.8%	5.6%	3.7%	2.8%
A little	574	635,243	27.5%	26.1%	28.8%	25.4%	23.1%	35.5%	29.2%	17.8%	27.1%	27.2%	27.8%	28.1%
Nothing	1,195	1,579,062	68.3%	70.3%	66.4%	71.3%	75.0%	56.7%	67.0%	76.8%	68.0%	67.2%	68.5%	69.1%
Total	1,871	2,310,400												
c. Iowa Student STEM Film Fest					*									
A lot	36	31,897	1.4%	1.3%	1.4%	1.1%	1.0%	2.2%	1.2%	2.4%	1.5%	1.7%	.8%	1.6%
A little	305	364,661	15.8%	12.3%	19.2%	16.3%	12.7%	18.7%	16.9%	10.7%	14.7%	14.3%	15.6%	17.9%
Nothing	1,530	1,914,358	82.8%	86.4%	79.4%	82.6%	86.3%	79.0%	81.9%	86.9%	83.8%	84.0%	83.7%	80.5%
Total	1871	2,310,916												
d. STEM Connector							*							
A lot	16	15,281	.7%	.8%	.5%	.5%	.9%	.6%	.6%	1.2%	.5%	1.0%	.2%	.6%
A little	142	137,926	6.0%	6.0%	6.0%	7.2%	3.1%	7.6%	5.8%	6.3%	6.6%	5.4%	6.7%	6.4%
Nothing	1,712	2,157,197	93.4%	93.2%	93.5%	92.3%	96.0%	91.8%	93.6%	92.5%	93.0%	93.6%	93.0%	93.0%
Total	1,870	2,310,404												

Q5. Please tell me how strongly you agree or disagree with the following statements														
	Total			Gender		Education			Parent Status			Location		
Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
a. Science and technology are making our lives better							**							
Strongly Agree	985	1,143,552	49.7%	52.1%	47.5%	33.5%	52.9%	67.9%	49.8%	48.4%	50.3%	45.4%	48.2%	57.2%
Agree	833	1,096,620	47.7%	45.3%	50.0%	63.1%	44.4%	30.7%	47.3%	49.1%	48.2%	51.4%	49.8%	40.4%
Agree/Disagree	14	18,569	.8%	.7%	.9%	.6%	.9%	1.0%	.9%	.9%	.2%	1.1%	.7%	.6%
Disagree	31	39,756	1.7%	1.9%	1.6%	2.8%	1.8%	.3%	1.9%	1.6%	1.3%	2.1%	1.2%	1.8%
Strongly Disagree	1	590	.0%	0.0%	.1%	0.0%	0.0%	.1%	.0%	0.0%	0.0%	0.0%	.1%	0.0%
Total	1,864	2,299,088												
b. Many more companies would move or expand to Iowa if the state had a reputation for workers with great science and math skills							**							*
Strongly Agree	563	669,887	29.5%	27.8%	31.1%	20.3%	33.7%	36.9%	30.6%	25.2%	27.8%	23.2%	33.7%	33.4%
Agree	1,088	1,379,604	60.7%	62.4%	59.1%	66.4%	59.5%	54.3%	58.9%	65.7%	64.8%	65.0%	56.1%	59.5%
Agree/Disagree	35	45,232	2.0%	2.2%	1.8%	1.8%	1.2%	3.1%	2.3%	2.0%	.8%	2.5%	1.2%	2.1%
Disagree	140	158,489	7.0%	6.7%	7.2%	9.9%	5.1%	5.2%	7.2%	6.9%	6.1%	8.4%	7.9%	4.4%
Strongly Disagree	8	19,617	.9%	.9%	.8%	1.6%	.4%	.5%	1.1%	.2%	.5%	.9%	1.1%	.7%
Total	1,834	2,272,830												
c. Increased focus on STEM education in Iowa will improve the economy							**							
Strongly Agree	456	550,557	24.5%	22.3%	26.7%	14.8%	28.7%	32.5%	25.5%	21.8%	22.2%	20.0%	23.7%	30.2%
Agree	1,179	1,451,912	64.6%	65.4%	63.8%	73.6%	62.2%	56.2%	62.6%	72.3%	67.4%	70.4%	64.1%	58.0%
Agree/Disagree	56	75,698	3.4%	4.6%	2.1%	2.4%	2.3%	5.1%	3.5%	2.1%	3.5%	2.8%	5.4%	2.4%
Disagree	127	164,111	7.3%	7.3%	7.3%	8.8%	6.8%	6.1%	8.1%	3.7%	6.3%	6.9%	6.7%	8.8%
Strongly Disagree	4	5,521	.2%	.4%	.1%	.5%	0.0%	.2%	.2%	0.0%	.6%	.0%	.2%	.6%
Total	1,822	2,247,799												

Q5. Please tell me how strongly you agree or disagree with the following statements														
	Total			Gender		Education			Parent Status			Location		
Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
d. Advancements in Science and technology are making our lives better							**							
Strongly Agree	840	1,012,872	44.0%	42.5%	45.4%	33.7%	50.7%	50.0%	43.5%	45.6%	44.9%	41.0%	44.6%	47.2%
Agree	992	1,241,297	53.9%	54.2%	53.5%	64.3%	47.6%	47.0%	54.2%	52.0%	53.9%	57.5%	53.4%	49.5%
Agree/Disagree	10	17,335	.8%	1.3%	.2%	.1%	.4%	2.0%	.8%	1.4%	0.0%	.7%	.9%	.8%
Disagree	24	32,917	1.4%	2.0%	.9%	1.8%	1.3%	1.0%	1.5%	1.1%	1.2%	.9%	1.1%	2.5%
Strongly Disagree	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	1,866	2,304,421												
e. There are more jobs available for people who have good math and science skills							**							
Strongly Agree	620	737,561	32.5%	33.6%	31.5%	23.3%	33.6%	43.7%	31.5%	33.1%	36.6%	29.5%	31.6%	37.8%
Agree	1,018	1,301,451	57.4%	58.2%	56.7%	68.3%	56.4%	44.8%	58.8%	57.3%	51.6%	61.9%	59.0%	49.1%
Agree/Disagree	45	57,542	2.5%	1.8%	3.3%	1.9%	1.9%	3.4%	2.4%	3.0%	2.6%	2.8%	2.5%	2.4%
Disagree	148	165,785	7.3%	6.1%	8.5%	6.5%	7.7%	8.0%	7.1%	6.4%	9.1%	5.8%	6.9%	10.3%
Strongly Disagree	3	3,962	.2%	.3%	.1%	0.0%	.5%	.1%	.2%	.2%	0.0%	0.0%	.1%	.5%
Total	1,834	2,266,301												
f. There should be more STEM jobs available for rural Iowans.							**							
Strongly Agree	427	506,869	22.7%	19.3%	26.1%	13.4%	26.3%	31.2%	22.7%	23.3%	22.7%	20.4%	20.1%	27.9%
Agree	1,246	1,535,829	68.9%	71.7%	66.2%	79.4%	64.9%	60.2%	69.1%	68.5%	68.3%	72.1%	72.9%	61.1%
Agree/Disagree	46	77,156	3.5%	4.0%	2.9%	2.4%	4.0%	3.6%	3.9%	1.4%	3.2%	2.5%	3.1%	5.3%
Disagree	89	107,761	4.8%	4.9%	4.8%	4.8%	4.8%	4.9%	4.4%	6.7%	5.5%	4.9%	3.9%	5.6%
Strongly Disagree	2	1,171	.1%	.0%	.1%	.1%	0.0%	.1%	0.0%	0.0%	.3%	0.0%	0.0%	.2%
Total	1,810	2,228,788												

Q5. Please tell me how strongly you agree or disagree with the following statements

Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
	Total			Gender		Education			Parent Status			Location		
g. More should be done to increase the number of women working in science, technology, engineering, and math jobs					*		**							*
Strongly Agree	580	725,017	32.1%	27.4%	36.6%	27.1%	31.4%	39.6%	32.9%	33.0%	27.9%	24.3%	33.5%	39.5%
Agree	1,039	1,253,742	55.5%	57.0%	54.1%	62.5%	57.4%	44.6%	55.3%	53.1%	57.9%	61.8%	55.1%	48.6%
Agree/Disagree	57	99,013	4.4%	6.6%	2.2%	2.4%	4.7%	5.9%	4.8%	3.9%	3.1%	4.5%	4.2%	4.6%
Disagree	146	170,559	7.5%	8.7%	6.5%	7.2%	6.1%	9.8%	6.3%	9.8%	11.1%	8.5%	7.2%	6.8%
Strongly Disagree	5	11,466	.5%	.3%	.7%	.9%	.4%	.2%	.7%	.1%	.1%	.9%	.1%	.4%
Total	1,827	2,259,796												
h. More should be done to increase the number of Hispanics and African Americans working in STEM jobs							**							**
Strongly Agree	381	441,650	19.8%	18.0%	21.5%	15.8%	18.9%	26.2%	19.0%	25.0%	19.3%	14.0%	22.7%	25.0%
Agree	1,032	1,289,269	57.8%	56.4%	59.2%	60.7%	58.4%	53.9%	58.2%	55.8%	57.6%	59.9%	56.8%	56.7%
Agree/Disagree	77	111,939	5.0%	7.1%	3.1%	2.1%	6.7%	6.2%	5.1%	4.4%	4.9%	4.7%	4.3%	6.3%
Disagree	288	351,957	15.8%	16.5%	15.1%	19.4%	14.9%	12.1%	15.8%	13.6%	17.2%	19.5%	15.5%	10.9%
Strongly Disagree	27	34,065	1.5%	1.9%	1.1%	1.9%	1.1%	1.5%	1.7%	1.2%	.9%	1.9%	.7%	1.2%
Total	1,805	2,228,880												
i. More people would choose a STEM job if it didn't seem so hard							**							*
Strongly Agree	266	333,756	15.0%	12.5%	17.4%	11.7%	18.9%	15.0%	15.3%	11.3%	16.5%	13.6%	11.2%	20.2%
Agree	1,056	1,278,120	57.5%	57.7%	57.2%	67.2%	58.0%	44.7%	56.4%	60.6%	59.7%	57.5%	65.4%	49.5%
Agree/Disagree	55	85,367	3.8%	5.1%	2.6%	2.5%	2.8%	6.9%	4.4%	1.8%	2.8%	3.9%	2.7%	5.1%
Disagree	388	503,846	22.6%	23.4%	21.9%	18.0%	19.7%	31.4%	22.7%	25.5%	20.4%	24.2%	19.6%	24.0%
Strongly Disagree	22	23,572	1.1%	1.2%	.9%	.7%	.7%	2.0%	1.2%	.9%	.6%	.9%	1.1%	1.2%
Total	1,787	2,224,661												
j. It is important for people to understand what engineering contributes to society							**							
Strongly Agree	582	727,186	31.6%	33.0%	30.2%	23.5%	35.3%	38.3%	31.9%	30.8%	30.9%	28.2%	31.4%	35.9%

Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
Q5. Please tell me how strongly you agree or disagree with the following statements														
	Total			Gender		Education			Parent Status			Location		
Agree	1,236	1,520,533	66.1%	63.6%	68.4%	75.0%	63.6%	57.6%	65.7%	68.1%	66.5%	69.4%	66.7%	61.6%
Agree/Disagree	16	24,513	1.1%	1.7%	.5%	.1%	.1%	2.7%	1.3%	.2%	.7%	.8%	.9%	1.6%
Disagree	28	28,682	1.2%	1.6%	.9%	1.4%	1.0%	1.3%	1.1%	.9%	1.9%	1.7%	1.0%	.9%
Strongly Disagree	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	1,862	2,300,914												
k. I cannot follow developments in science and technology because the speed of development is too fast.														
					**		**							**
Strongly Agree	96	114,946	5.1%	4.4%	5.7%	7.3%	4.2%	3.1%	5.5%	4.0%	4.0%	5.8%	4.7%	3.7%
Agree	751	916,942	40.4%	34.1%	46.4%	54.5%	36.4%	26.9%	42.4%	34.7%	35.9%	47.6%	41.5%	29.8%
Agree/Disagree	31	40,955	1.8%	1.0%	2.5%	.9%	3.3%	1.3%	1.8%	.9%	2.6%	1.2%	1.0%	3.4%
Disagree	859	1,037,613	45.7%	50.7%	40.9%	34.9%	46.1%	58.8%	42.9%	54.0%	51.8%	42.6%	46.1%	49.4%
Strongly Disagree	101	160,202	7.1%	9.7%	4.5%	2.3%	10.0%	9.9%	7.5%	6.3%	5.7%	2.8%	6.6%	13.8%
Total	1,838	2,270,658												
l. There is an urgent need in Iowa for more resources to be put toward STEM education														
Strongly Agree	316	395,494	17.8%	16.0%	19.5%	14.4%	16.2%	24.0%	18.8%	15.0%	15.4%	15.4%	13.8%	24.6%
Agree	1,273	1,520,852	68.4%	67.2%	69.5%	72.3%	70.5%	61.5%	66.7%	69.7%	74.5%	71.2%	73.6%	59.2%
Agree/Disagree	56	82,512	3.7%	5.0%	2.4%	2.2%	3.8%	4.8%	4.0%	4.7%	2.0%	2.8%	4.8%	4.2%
Disagree	152	222,663	10.0%	11.6%	8.4%	10.8%	9.5%	9.6%	10.5%	10.7%	7.6%	10.5%	7.8%	11.7%
Strongly Disagree	3	2,930	.1%	.1%	.2%	.3%	0.0%	.1%	.1%	0.0%	.5%	.1%	0.0%	.3%
Total	1,800	2,224,451												

Q5. Please tell me how strongly you agree or disagree with the following statements

	Total			Gender		Education			Parent Status			Location		
Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
m. Science, technology, and engineering are too specialized for most people to understand it.							**			*				
Strongly Agree	76	105,800	4.6%	4.3%	4.9%	6.6%	3.7%	3.0%	4.7%	2.6%	5.8%	5.1%	3.8%	4.3%
Agree	725	919,464	40.1%	36.7%	43.4%	54.1%	42.0%	20.0%	41.1%	36.8%	38.2%	41.8%	39.5%	37.0%
Agree/Disagree	54	74,078	3.2%	3.5%	2.9%	1.0%	3.5%	5.0%	3.5%	1.2%	3.4%	3.0%	4.1%	2.7%
Disagree	916	1,095,808	47.8%	50.9%	44.7%	35.4%	47.0%	65.2%	46.7%	56.7%	46.0%	47.4%	47.6%	49.9%
Strongly Disagree	85	98,679	4.3%	4.6%	4.1%	2.9%	3.8%	6.8%	4.0%	2.7%	6.6%	2.7%	5.1%	6.1%
Total	1,856	2,293,829												

Q6. Compared to other states, where do you think Iowa ranks in students' standardized MATH scores?

	Total			Gender		Education			Parent Status			Location		
				**			**							
Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
Top third	634	771,948	34.1%	42.2%	26.4%	23.6%	39.0%	42.4%	34.2%	35.9%	32.4%	35.1%	30.8%	37.1%
Near the middle	981	1,176,096	52.0%	47.6%	56.2%	59.3%	48.0%	46.7%	51.1%	50.1%	57.3%	51.5%	58.5%	45.1%
Bottom third	220	314,077	13.9%	10.2%	17.4%	17.0%	12.9%	11.0%	14.7%	14.0%	10.3%	13.3%	10.8%	17.8%
Total	1,835	2,262,121												

Q7. Compared to other states, where do you think Iowa ranks in students' standardized SCIENCE scores?

	Total			Gender **		Education **			Parent Status			Location		
Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
Top third	542	653,799	29.0%	34.6%	23.6%	20.3%	30.5%	38.6%	28.7%	33.8%	26.9%	31.1%	26.8%	28.9%
Near the middle	1,063	1,316,378	58.4%	55.7%	60.9%	63.7%	55.8%	54.1%	59.2%	53.9%	58.2%	56.5%	59.6%	58.3%
Bottom third	227	284,988	12.6%	9.7%	15.4%	16.0%	13.6%	7.3%	12.2%	12.3%	14.9%	12.3%	13.6%	12.8%
Total	1,832	2,255,165												

Q8. Are there more than enough, not enough, or just the right number of skilled workers in Iowa to fill the available jobs in STEM areas?

	Total			Gender		Education			Parent Status			Location		
Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
More than enough	120	159,491	7.4%	5.7%	9.0%	8.5%	6.5%	7.0%	7.5%	8.7%	5.7%	7.9%	5.9%	8.5%
Not enough	1,294	1,557,235	72.1%	71.9%	72.3%	66.7%	75.6%	75.8%	72.6%	64.8%	75.1%	70.9%	73.0%	72.8%
Just right	340	443,671	20.5%	22.4%	18.7%	24.8%	17.9%	17.2%	19.8%	26.5%	19.2%	21.3%	21.1%	18.7%
Total	1,754	2,160,398												

Q9. How well do you think the schools in your community are teaching each of the following topics-MATHEMATICS

	Total			Gender		Education			Parent Status			Location		
Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
a. Mathematics														*
Excellent	274	311,756	13.8%	13.9%	13.7%	13.1%	13.7%	14.7%	13.3%	15.6%	14.5%	13.1%	18.7%	9.8%
Good	904	1,069,064	47.3%	48.8%	45.8%	41.6%	52.4%	48.9%	46.1%	52.6%	48.4%	50.3%	47.1%	43.8%
Fair	479	623,505	27.6%	25.5%	29.5%	30.5%	26.0%	25.5%	29.3%	22.7%	23.7%	27.5%	21.8%	32.5%
Poor	179	257,503	11.4%	11.8%	10.9%	14.8%	7.8%	10.9%	11.3%	9.1%	13.4%	9.1%	12.4%	14.0%
Total	1,836	2,261,827												
b. Science							*							
Excellent	239	285,956	12.7%	12.9%	12.5%	12.1%	13.9%	12.1%	12.4%	10.7%	15.4%	12.6%	12.3%	13.1%
Good	906	1,098,743	48.8%	47.5%	50.1%	45.7%	46.2%	55.7%	48.3%	57.3%	45.0%	50.3%	50.3%	45.7%
Fair	549	684,178	30.4%	30.3%	30.5%	30.7%	32.4%	27.9%	31.4%	24.4%	30.6%	29.4%	29.0%	32.7%
Poor	135	181,992	8.1%	9.3%	6.9%	11.5%	7.5%	4.3%	8.0%	7.6%	9.0%	7.7%	8.4%	8.5%
Total	1,829	2,250,870												
c. Civics, History, and Social Studies					*									
Excellent	203	224,581	10.0%	10.8%	9.2%	9.8%	8.2%	12.1%	9.7%	9.9%	11.4%	9.9%	9.9%	9.8%
Good	899	1,086,750	48.3%	44.7%	51.7%	45.8%	48.1%	51.7%	47.0%	47.5%	54.1%	53.3%	45.3%	44.2%
Fair	512	684,891	30.4%	30.6%	30.2%	31.9%	33.0%	25.7%	30.9%	34.7%	25.5%	25.5%	31.5%	35.7%
Poor	209	254,861	11.3%	13.9%	8.9%	12.5%	10.7%	10.5%	12.4%	7.9%	9.1%	11.2%	13.2%	10.3%
Total	1,823	2,251,082												
d. English														
Excellent	300	349,796	15.5%	13.2%	17.6%	13.1%	14.2%	20.0%	14.5%	17.9%	17.8%	15.6%	15.9%	14.9%
Good	912	1,110,751	49.1%	50.8%	47.5%	51.6%	45.8%	49.5%	48.4%	50.8%	50.9%	53.4%	46.7%	46.3%
Fair	479	610,107	27.0%	26.9%	27.0%	27.5%	30.3%	22.7%	28.0%	24.7%	24.4%	24.5%	29.1%	29.1%
Poor	145	191,117	8.4%	9.0%	7.9%	7.8%	9.7%	7.8%	9.1%	6.6%	6.9%	6.5%	8.3%	9.6%
Total	1,836	2,261,770												

Q9. How well do you think the schools in your community are teaching each of the following topics-MATHEMATICS

Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
	Total			Gender		Education			Parent Status			Location		
e. Engineering														*
Excellent	117	122,822	5.7%	4.7%	6.7%	5.8%	5.6%	5.7%	5.3%	9.3%	4.7%	4.3%	8.6%	3.8%
Good	543	654,260	30.4%	32.8%	28.2%	32.5%	30.9%	27.2%	31.1%	28.6%	28.9%	30.5%	33.7%	27.1%
Fair	651	778,535	36.2%	33.3%	38.9%	35.1%	37.1%	36.8%	35.8%	38.4%	36.4%	34.8%	36.5%	38.3%
Poor	437	593,827	27.6%	29.2%	26.2%	26.6%	26.4%	30.2%	27.7%	23.7%	30.0%	30.4%	21.2%	30.9%
Total	1,748	2,149,443												
f. Technology														
Excellent	207	226,417	10.2%	9.4%	10.9%	9.7%	10.0%	10.9%	10.1%	11.2%	9.5%	10.3%	12.0%	8.3%
Good	817	954,457	42.8%	42.8%	42.9%	39.8%	43.4%	46.2%	42.3%	42.6%	45.1%	45.2%	41.8%	40.1%
Fair	595	734,537	33.0%	32.4%	33.5%	34.6%	32.8%	31.0%	33.1%	34.7%	31.2%	31.3%	33.8%	33.9%
Poor	190	313,303	14.1%	15.5%	12.7%	15.9%	13.8%	11.9%	14.5%	11.4%	14.2%	13.1%	12.4%	17.6%
Total	1,809	2,228,714												
g. Foreign Languages														
Excellent	125	131,013	6.0%	5.8%	6.1%	4.4%	7.2%	6.4%	5.3%	6.0%	8.8%	5.3%	7.6%	5.5%
Good	606	763,908	34.7%	37.8%	31.8%	33.5%	33.6%	37.7%	34.9%	28.8%	38.2%	35.3%	31.7%	35.8%
Fair	701	826,940	37.6%	37.1%	38.0%	39.9%	38.3%	33.7%	36.9%	46.8%	33.7%	37.1%	44.2%	32.2%
Poor	353	479,978	21.8%	19.3%	24.1%	22.2%	20.9%	22.3%	23.0%	18.4%	19.3%	22.3%	16.5%	26.5%
Total	1,785	2,201,838												
h. Art														*
Excellent	190	208,326	9.5%	8.8%	10.1%	8.8%	8.5%	11.3%	9.3%	9.3%	10.3%	10.5%	11.3%	6.0%
Good	824	1,015,458	46.2%	45.2%	47.1%	49.6%	42.5%	45.9%	46.3%	48.2%	44.5%	49.1%	44.1%	44.7%
Fair	604	759,549	34.6%	36.8%	32.5%	32.8%	37.9%	33.2%	33.9%	37.7%	34.9%	32.0%	36.2%	36.1%
Poor	173	214,890	9.8%	9.2%	10.3%	8.8%	11.0%	9.6%	10.5%	4.8%	10.3%	8.5%	8.4%	13.2%
Total	1,791	2,198,223												

Q9. How well do you think the schools in your community are teaching each of the following topics-MATHEMATICS														
	Total			Gender		Education			Parent Status			Location		
Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
i. Music														
Excellent	338	397,393	17.8%	15.6%	19.9%	15.8%	16.2%	22.3%	18.3%	13.2%	19.4%	19.6%	17.9%	14.9%
Good	842	997,015	44.8%	47.2%	42.6%	47.2%	43.8%	42.8%	45.1%	45.8%	42.6%	47.6%	43.9%	43.0%
Fair	493	637,085	28.6%	30.1%	27.2%	25.7%	32.3%	28.4%	27.6%	34.5%	28.6%	26.4%	31.0%	29.7%
Poor	149	195,058	8.8%	7.1%	10.3%	11.3%	7.7%	6.5%	9.0%	6.4%	9.4%	6.4%	7.2%	12.4%
Total	1,822	2,226,551												

Q10. How essential topic is for students to learn before graduating from high school?														
	Total			Gender		Education			Parent Status			Location		
Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
a. Basic Math Skills							**							
Absolutely essential	1,700	2,090,170	90.6%	88.6%	92.4%	86.2%	92.6%	94.7%	89.7%	93.2%	92.4%	90.1%	89.5%	91.9%
Important but not essential	165	210,585	9.1%	11.0%	7.3%	13.1%	7.3%	5.3%	9.9%	6.8%	7.4%	9.6%	10.4%	7.4%
Not important	5	7,177	.3%	.4%	.3%	.7%	.1%	0.0%	.4%	0.0%	.3%	.3%	.0%	.7%
Total	1870	2,307,932												
b. Basic Science Ideas and Principles							**							
Absolutely essential	1,314	1,575,406	68.3%	64.8%	71.7%	62.2%	71.1%	73.7%	67.3%	74.6%	67.8%	68.5%	70.5%	65.9%
Important but not essential	538	707,342	30.7%	33.7%	27.7%	35.9%	28.4%	25.9%	31.7%	23.4%	31.3%	30.4%	28.9%	32.8%
Not important	17	24,242	1.1%	1.5%	.6%	2.0%	.5%	.5%	.9%	2.0%	.9%	1.0%	.6%	1.3%
Total	1,869	2,306,990												

c. Advanced Science such as Physics							*							
Absolutely essential	503	636,018	27.6%	27.0%	28.3%	33.5%	25.2%	22.9%	27.9%	30.1%	24.6%	24.7%	31.2%	27.6%
Important but not essential	1,252	1,507,965	65.5%	66.0%	65.0%	59.7%	67.0%	71.1%	65.3%	64.1%	67.6%	68.7%	62.0%	65.3%
Not important	108	158,015	6.9%	7.0%	6.8%	6.8%	7.7%	6.0%	6.8%	5.8%	7.8%	6.7%	6.8%	7.1%
Total	1,863	2,301,999												
d. Advanced Math such as Calculus							**							
Absolutely essential	490	600,676	26.1%	23.6%	28.5%	32.5%	27.7%	16.2%	25.7%	29.4%	25.6%	25.6%	28.9%	23.4%
Important but not essential	1,178	1,448,937	63.0%	65.0%	61.2%	56.6%	61.1%	73.4%	63.9%	62.4%	59.5%	62.5%	62.5%	65.1%
Not important	193	248,547	10.8%	11.4%	10.2%	10.9%	11.2%	10.4%	10.3%	8.2%	14.8%	11.9%	8.6%	11.4%
Total	1,861	2,298,159												
e. Using Technology to Support Learning				**			**							
Absolutely essential	1,291	1,539,151	66.6%	61.7%	71.3%	60.1%	67.7%	74.3%	66.0%	70.9%	66.1%	65.4%	67.2%	69.2%
Important but not essential	547	723,360	31.3%	34.7%	28.1%	37.7%	30.8%	23.0%	31.8%	27.9%	31.8%	32.5%	30.9%	28.4%
Not important	33	48,228	2.1%	3.6%	.6%	2.2%	1.4%	2.7%	2.2%	1.2%	2.0%	2.1%	1.9%	2.4%
Total	1,871	2,310,738												
f. Engineering and Industrial Technology Principles and Skills							**							
Absolutely essential	629	772,947	33.5%	32.7%	34.3%	43.1%	31.3%	23.7%	33.8%	35.1%	31.4%	35.7%	32.5%	31.5%
Important but not essential	1,156	1,401,971	60.8%	61.0%	60.6%	51.1%	63.1%	70.7%	60.9%	58.8%	61.9%	59.3%	64.0%	60.2%
Not important	81	130,812	5.7%	6.3%	5.1%	5.8%	5.6%	5.7%	5.3%	6.1%	6.8%	5.0%	3.6%	8.4%
Total	1,866	2,305,730												

Q11. If statement explain why some students may do poorly in math and science.

	Total			Gender		Education			Parent Status			Location		
Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
a. There are NOT ENOUGH good math and science teachers.										**				*
Yes	1,081	1,301,874	57.9%	55.7%	60.0%	61.9%	58.7%	52.2%	59.4%	46.2%	59.9%	62.6%	57.2%	51.4%
No	728	946,192	42.1%	44.3%	40.0%	38.1%	41.3%	47.8%	40.6%	53.8%	40.1%	37.4%	42.8%	48.6%
Total	1,809	2,248,066												
b. Students think the subject is NOT RELEVENT to their lives.														
Yes	1,553	1,959,799	86.0%	85.6%	86.4%	85.0%	86.3%	87.5%	86.6%	85.7%	83.6%	84.0%	87.2%	88.0%
No	288	318,932	14.0%	14.4%	13.6%	15.0%	13.7%	12.5%	13.4%	14.3%	16.4%	16.0%	12.8%	12.0%
Total	1,841	2,278,730												
c. Students think math and science are TOO HARD to learn.					*									
Yes	1,465	1,816,304	79.5%	76.4%	82.6%	79.0%	81.2%	78.3%	79.6%	77.2%	81.0%	77.8%	81.0%	80.2%
No	381	467,711	20.5%	23.6%	17.4%	21.0%	18.8%	21.7%	20.4%	22.8%	19.0%	22.2%	19.0%	19.8%
Total	1,846	2,284,015												

Q12. How strongly do you agree or disagree.														
	Total			Gender		Education			Parent Status			Location		
Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
a. It is more important for students to graduate from high school with strong skills in reading and writing than it is to have strong skills in math and science.									**					
Strongly Agree	209	277,833	12.1%	9.4%	14.7%	12.8%	11.2%	12.4%	13.6%	6.7%	9.7%	10.3%	10.8%	16.0%
Agree	690	865,982	37.8%	39.7%	35.9%	38.8%	38.2%	35.4%	41.1%	29.6%	29.2%	36.5%	44.5%	32.0%
Disagree	61	62,947	2.7%	3.3%	2.2%	1.5%	3.6%	3.4%	2.7%	1.9%	3.5%	3.3%	1.9%	2.6%
Agree/Disagree	737	924,047	40.3%	40.9%	39.7%	40.8%	39.4%	40.9%	36.3%	53.7%	47.8%	42.9%	36.4%	41.1%
Strongly Disagree	152	162,204	7.1%	6.7%	7.4%	6.1%	7.6%	7.9%	6.3%	8.1%	9.7%	6.9%	6.5%	8.3%
Total	1,849	2,293,014												
b. Advanced math and science courses teach important critical thinking skills.							**							
Strongly Agree	567	656,330	28.5%	28.2%	28.8%	20.5%	28.1%	39.8%	28.7%	31.0%	26.0%	23.6%	29.3%	34.1%
Agree	1,220	1,524,211	66.2%	67.3%	65.2%	72.9%	65.9%	57.7%	66.3%	62.5%	68.6%	70.8%	67.3%	59.1%
Disagree	9	13,489	.6%	.7%	.5%	.3%	1.2%	.2%	.8%	.2%	.1%	1.1%	.3%	.2%
Agree/Disagree	64	104,067	4.5%	3.5%	5.5%	6.2%	4.7%	2.2%	4.1%	5.9%	5.2%	4.4%	3.2%	6.3%
Strongly Disagree	3	3,177	.1%	.2%	.1%	.1%	.2%	.2%	.1%	.4%	.2%	.1%	0.0%	.3%
Total	1,863	2,301,273												
c. Overall, the quality of STEM education in Iowa is high.							**							
Strongly Agree	53	66,946	3.2%	3.4%	2.9%	4.5%	3.0%	1.7%	3.5%	3.7%	1.4%	3.4%	4.6%	1.7%
Agree	897	1,158,945	55.2%	58.5%	51.8%	56.1%	53.2%	56.6%	56.4%	52.4%	52.1%	52.1%	52.1%	61.5%
Disagree	56	53,689	2.6%	3.1%	2.0%	1.1%	2.5%	3.7%	2.0%	3.8%	3.8%	2.9%	3.2%	1.5%
Agree/Disagree	651	756,458	36.0%	31.4%	40.7%	32.9%	39.2%	36.7%	35.3%	37.5%	38.3%	38.9%	35.5%	33.1%
Strongly Disagree	37	64,052	3.0%	3.5%	2.6%	5.4%	2.1%	1.2%	2.8%	2.6%	4.5%	2.7%	4.6%	2.2%
Total	1,694	2,100,090												

Q12. How strongly do you agree or disagree.														
	Total			Gender		Education			Parent Status			Location		
Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
d. Iowa colleges and universities are doing a good job preparing STEM teachers.														
Strongly Agree	111	136,589	7.2%	7.2%	7.2%	9.4%	5.9%	6.0%	7.6%	6.8%	6.0%	6.9%	9.0%	6.1%
Agree	991	1,246,091	65.8%	65.5%	66.1%	67.3%	65.5%	64.8%	64.5%	71.9%	67.0%	64.4%	65.3%	66.9%
Disagree	54	64,690	3.4%	3.8%	3.1%	1.1%	4.0%	4.9%	3.8%	2.6%	2.3%	3.9%	3.4%	2.8%
Agree/Disagree	336	428,363	22.6%	23.0%	22.3%	21.5%	23.8%	23.0%	23.2%	18.2%	23.6%	23.9%	20.9%	23.5%
Strongly Disagree	19	17,597	.9%	.5%	1.3%	.7%	.9%	1.3%	1.0%	.5%	1.1%	.8%	1.3%	.7%
Total	1,511	1,893,329												
e. Iowa colleges and universities are doing a good job preparing students for careers in STEM fields.														
Strongly Agree	119	140,312	6.9%	8.4%	5.5%	8.5%	6.6%	5.4%	6.7%	6.7%	8.3%	6.1%	9.2%	5.8%
Agree	1,182	1,480,200	73.2%	71.4%	74.9%	72.3%	74.4%	73.4%	72.8%	76.9%	71.7%	73.8%	73.8%	72.3%
Disagree	47	52,424	2.6%	3.1%	2.1%	1.1%	3.4%	2.8%	2.6%	2.4%	2.8%	2.8%	3.1%	1.8%
Agree/Disagree	268	337,762	16.7%	16.5%	16.8%	17.7%	14.8%	17.7%	17.3%	13.6%	16.5%	16.9%	12.8%	19.5%
Strongly Disagree	13	12,625	.6%	.6%	.7%	.4%	.8%	.7%	.6%	.5%	.6%	.5%	1.1%	.5%
Total	1,629	2,023,323												
f. Too few racial and ethnic minority students are encouraged to study STEM topics.														
Strongly Agree	98	123,117	6.0%	6.4%	5.7%	5.8%	4.8%	7.7%	6.4%	4.5%	5.5%	4.8%	4.0%	9.8%
Agree	800	1,034,575	50.7%	45.5%	55.6%	54.7%	47.5%	49.2%	53.0%	44.5%	44.9%	50.8%	52.8%	47.6%
Disagree	32	39,741	1.9%	2.5%	1.4%	1.2%	1.8%	2.4%	2.1%	.7%	2.2%	2.3%	2.4%	1.1%
Agree/Disagree	634	793,250	38.8%	42.5%	35.3%	36.6%	43.2%	37.3%	36.2%	47.9%	43.9%	39.7%	36.3%	40.4%
Strongly Disagree	50	51,681	2.5%	3.1%	2.0%	1.7%	2.8%	3.4%	2.3%	2.4%	3.6%	2.4%	4.5%	1.0%
Total	1,614	2,042,364												

Q13. How much each of the following strategies would improve math and science education.														
	Total			Gender		Education			Parent Status			Location		
Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
a. Businesses provided internships so high school students can gain practical job skills.														*
Major improvement	1,093	1,282,118	55.7%	54.1%	57.3%	57.7%	56.9%	52.1%	55.0%	54.2%	60.0%	51.2%	59.1%	58.6%
Moderate improvement	691	910,693	39.6%	40.3%	38.9%	37.5%	39.0%	42.6%	40.1%	41.0%	36.2%	45.4%	37.0%	34.0%
Little or no improvement	79	107,114	4.7%	5.6%	3.7%	4.8%	4.1%	5.2%	4.8%	4.8%	3.8%	3.5%	3.8%	7.4%
Total	1,863	2,299,925												
b. Students who are struggling with math or science were required to spend extra time after school or during the summer to catch up.							*							
Major improvement	839	993,207	43.5%	42.0%	44.9%	48.2%	45.6%	35.0%	43.8%	42.0%	43.1%	39.6%	46.2%	45.3%
Moderate improvement	776	904,172	39.6%	39.8%	39.3%	38.5%	37.1%	44.1%	37.9%	42.3%	44.7%	42.7%	39.2%	35.9%
Little or no improvement	238	387,766	17.0%	18.2%	15.8%	13.3%	17.2%	20.9%	18.3%	15.7%	12.2%	17.6%	14.6%	18.7%
Total	1,853	2,285,146												
c. All high school students were required to take a science class that includes lab work.														
Major improvement	982	1,209,757	52.8%	50.5%	55.1%	48.3%	56.9%	54.6%	52.8%	51.8%	53.6%	50.4%	56.1%	53.0%
Moderate improvement	737	885,793	38.7%	40.7%	36.8%	41.1%	36.5%	38.2%	38.5%	36.9%	40.7%	39.6%	38.3%	38.1%
Little or no improvement	136	195,183	8.5%	8.9%	8.2%	10.6%	6.6%	7.2%	8.7%	11.2%	5.7%	10.0%	5.6%	8.9%
Total	1,855	2,290,732												
d. We made sure that all Iowa students have the opportunity to take a full range of math courses.					*									**
Major improvement	1,175	1,452,503	63.5%	59.6%	67.1%	62.6%	65.7%	62.5%	63.4%	62.7%	64.0%	60.1%	60.3%	71.6%
Moderate improvement	607	747,497	32.7%	35.7%	29.8%	33.5%	30.4%	33.5%	32.4%	34.7%	32.1%	35.2%	37.2%	24.4%
Little or no improvement	65	88,998	3.9%	4.7%	3.1%	3.8%	3.9%	3.9%	4.1%	2.6%	3.9%	4.7%	2.5%	4.0%
Total	1,847	2,288,999												

Q13. How much each of the following strategies would improve math and science education.

	Total			Gender		Education			Parent Status			Location		
Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
e. Students were required to pass challenging tests in math and science in order to graduate from high school.										*				**
Major improvement	713	927,737	41.1%	43.4%	38.9%	44.7%	42.7%	34.8%	42.6%	36.6%	37.7%	37.4%	46.0%	41.6%
Moderate improvement	758	838,302	37.1%	35.1%	39.0%	37.0%	37.7%	36.9%	34.0%	45.9%	44.0%	38.6%	39.2%	33.0%
Little or no improvement	372	493,032	21.8%	21.5%	22.1%	18.3%	19.6%	28.3%	23.4%	17.4%	18.4%	24.1%	14.7%	25.3%
Total	1,843	2,259,071												
f. Fast learners were grouped together in one class and slower learners in another class.							*							**
Major improvement	706	850,322	37.6%	35.9%	39.3%	41.2%	40.0%	30.5%	37.4%	38.4%	37.9%	37.8%	35.4%	37.5%
Moderate improvement	657	807,141	35.7%	38.7%	32.8%	32.7%	36.6%	39.0%	35.5%	34.9%	37.0%	35.5%	37.9%	35.4%
Little or no improvement	463	603,321	26.7%	25.5%	27.9%	26.1%	23.4%	30.6%	27.0%	26.7%	25.1%	26.7%	26.8%	27.1%
Total	1,826	2,260,785												
g. We made sure that all Iowa students have the opportunity to take a full range of science courses.														
Major improvement	1,063	1,305,132	56.9%	53.7%	59.9%	57.3%	55.2%	58.7%	58.0%	58.5%	50.7%	56.0%	55.9%	59.6%
Moderate improvement	706	871,086	38.0%	40.2%	35.8%	37.1%	41.3%	34.8%	36.4%	37.8%	44.8%	39.5%	39.2%	34.3%
Little or no improvement	84	118,967	5.2%	6.1%	4.3%	5.7%	3.5%	6.5%	5.6%	3.7%	4.5%	4.5%	4.9%	6.2%
Total	1,853	2,295,185												
h. Math and science teachers were paid more than other teachers.					*									
Major improvement	278	324,285	14.6%	15.4%	13.7%	15.8%	13.6%	14.1%	15.3%	15.1%	11.2%	12.5%	15.1%	16.9%
Moderate improvement	655	800,350	36.0%	39.8%	32.2%	35.7%	39.3%	32.9%	35.9%	34.2%	37.4%	36.9%	40.0%	31.0%
Little or no improvement	884	1,101,233	49.5%	44.8%	54.0%	48.5%	47.0%	53.0%	48.8%	50.7%	51.4%	50.6%	44.9%	52.2%
Total	1,817	2,225,868												

Q13. How much each of the following strategies would improve math and science education.														
	Total			Gender		Education			Parent Status			Location		
Response Options	Total n	Pop. Est.	Valid %	Male	Female	HS/less	Some College	BA or More	Child Not School Aged	Child 4-11	Child 12-19	Farm/ Sm. Town	Lg. Town/ Sm. City	Large City
i. Every school building had high-speed internet access.														
Major improvement	1,064	1,283,690	56.2%	53.6%	58.6%	56.9%	56.2%	55.5%	57.6%	58.5%	48.4%	53.7%	58.4%	58.1%
Moderate improvement	596	743,086	32.5%	34.2%	30.9%	32.9%	33.5%	31.1%	31.4%	31.6%	37.7%	34.2%	33.4%	28.6%
Little or no improvement	184	258,848	11.3%	12.2%	10.5%	10.2%	10.2%	13.4%	11.0%	9.9%	13.9%	12.1%	8.2%	13.3%
Total	1,844	2,285,625												
j. More hands-on science and technology activities were available to elementary students													*	
Major improvement	1,296	1,548,141	67.8%	65.1%	70.3%	64.7%	70.4%	69.3%	67.2%	72.7%	66.6%	63.9%	68.3%	72.4%
Moderate improvement	498	629,299	27.5%	30.2%	25.0%	29.7%	25.8%	26.2%	27.8%	23.4%	29.6%	30.1%	28.9%	22.8%
Little or no improvement	71	107,537	4.7%	4.7%	4.7%	5.6%	3.8%	4.6%	5.1%	3.9%	3.8%	6.0%	2.9%	4.8%
Total	1,865	2,284,976												

Questions 14-17 not reported. These questions were asked to randomly select a target child for questions in the parent module.

Q18. Which of the following describes this child's education situation? This child…

	Total			Child 4-11			Child 12-19		
Response Options	Total n	Pop. Est.	Valid %	Total n	Pop. Est.	Valid %	Total n	Pop. Est.	Valid %
Has been or will be attending a public school	518	395,876	75.8%	252	205,128	87.3%	266	190,748	66.4%
Has been or will be attending a private school	69	52,504	10.1%	31	21,415	9.1%	38	31,089	10.8%
Has been or will be attending a charter school	1	557	.1%	1	557	.2%	0	0	0.0%
Is home-schooled	20	16,903	3.2%	8	7,736	3.3%	12	9,168	3.2%
Has graduated from high school or has their GED	71	56,347	10.8%	0	0	0.0%	71	56,347	19.6%
Total	679	522,187		292	23,4835		387	287,351	

Q18b. Has your child used, or have you used, the internet or a smart phone to help them complete their homework or school assignments?

	Total			Child 4-11			Child 12-19		
Response Options	Total n	Pop. Est.	Valid %	Total n	Pop. Est.	Valid %	Total n	Pop. Est.	Valid %
Yes	510	367,685	78.9%	206	145,407	61.9%	304	222,278	96.2%
No	98	98,155	21.1%	86	89,428	38.1%	12	8,727	3.8%
Total	608	465,840		292	234,835		316	231,005	

Q18c. Does your child have a school-issued iPad, tablet, or laptop?									
	Total			Child 4-11			Child 12-19		
Response Options	Total n	Pop. Est.	Valid %	Total n	Pop. Est.	Valid %	Total n	Pop. Est.	Valid %
Yes	123	87,301	18.7%	26	20,055	8.5%	97	67,246	29.1%
No	485	378,539	81.3%	266	214,781	91.5%	219	163,759	70.9%
Total	608	465,840		292	234,835		316	231,005	

Q21. In general, how much interest does this child show in science, technology, engineering, and math topics?									
	Total			Child 4-11			Child 12-19		
Response Options	Total n	Pop. Est.	Valid %	Total n	Pop. Est.	Valid %	Total n	Pop. Est.	Valid %
A lot of interest	302	217,707	46.8%	147	107,053	45.6%	155	110,655	47.9%
Some interest	232	183,257	39.4%	106	93,633	39.9%	126	89,624	38.8%
Little or no interest	73	64,635	13.9%	38	33,908	14.5%	35	30,726	13.3%
Total	607	465,599		291	234,594		316	231,005	

Q22. How well is the child doing in these subjects?									
	Total			Child 4-11			Child 12-19		
Response Options	Total n	Pop. Est.	Valid %	Total n	Pop. Est.	Valid %	Total n	Pop. Est.	Valid %
Very well	382	272,306	58.9%	188	144,207	62.3%	194	128,099	55.5%
OK	197	171,061	37.0%	93	80,372	34.7%	104	90,689	39.3%
Not very well	25	19,032	4.1%	8	7,027	3.0%	17	12,005	5.2%
Total	604	462,399		289	231,606		315	230,793	

Q23. How well is this child being prepared in these subjects by the school he or she attends?									
	Total			Child 4-11			Child 12-19		
Response Options	Total n	Pop. Est.	Valid %	Total n	Pop. Est.	Valid %	Total n	Pop. Est.	Valid %
Very well-prepared	285	218,971	47.1%	138	111,397	47.4%	147	107,574	46.9%
Somewhat prepared	282	213,554	46.0%	134	108,665	46.3%	148	104,889	45.7%
Not well-prepared	39	31,922	6.9%	20	14,773	6.3%	19	17,149	7.5%
Total	606	464,447		292	234,835		314	229,612	

Q23b. Over the past year, has your child participated, enrolled, or plan to enroll in…..									
	Total			Child 4-11			Child 12-19		
Response Options	Total n	Pop. Est.	Valid %	Total n	Pop. Est.	Valid %	Total n	Pop. Est.	Valid %
a. .day program or summer camp related to science, technology, engineering, or mathematics?									
Yes	99	72,078	15.5%	57	43,693	18.7%	42	28,384	12.3%
No	508	392,963	84.5%	234	190,343	81.3%	274	202,620	87.7%
Total	607	465,041		291	234,036		316	231,005	
b. after-school program for enriched learning about science, technology, engineering, or mathematics?									
Yes	60	40,173	8.7%	22	15,578	6.7%	38	24,595	10.8%
No	545	421,122	91.3%	269	218,458	93.3%	276	202,665	89.2%
Total	605	461,296		291	234,036		314	227,259	
c. boy/girl scouts?									
Yes	94	72,146	15.5%	62	48,630	20.8%	32	23,516	10.2%
No	513	392,895	84.5%	229	185,406	79.2%	284	207,489	89.8%
Total	607	465,041		291	234,036		316	231,005	
d. 4-H?									
Yes	76	54,922	11.9%	28	22,891	9.9%	48	32,031	13.9%
No	530	407,515	88.1%	262	208,541	90.1%	268	198,974	86.1%
Total	606	462,438		290	231,433		316	231,005	
e. Any other structured activity related to science, technology, engineering, or mathematics?									
Yes	87	54,317	11.7%	40	22,811	9.7%	47	31,506	13.8%
No	520	408,782	88.3%	252	212,024	90.3%	268	196,758	86.2%
Total	607	463,099		292	234,835		315	228,264	

Q24. Which of the following do you think this child will most likely do after high school graduation?									
	Total			Child 4-11			Child 12-19		
Response Options	Total n	Pop. Est.	Valid %	Total n	Pop. Est.	Valid %	Total n	Pop. Est.	Valid %
Attend a 4-year college or university	199	121,061	54.2%				199	121,061	54.2%
Attend a 2-year community college	65	59,923	26.8%				65	59,923	26.8%
Attend a vocational or training school	17	12,971	5.8%				17	12,971	5.8%
Enlist in the military	9	6,220	2.8%				9	6,220	2.8%
Work	14	17,361	7.8%				14	17,361	7.8%
Something else [SPECIFY]	5	5,686	2.5%				5	5,686	2.5%
Total	309	223,223					309	223,223	

Q25. Do you think your child will pursue a career in a field related to science, technology, engineering, or math?									
	Total			Child 4-11			Child 12-19		
Response Options	Total n	Pop. Est.	Valid %	Total n	Pop. Est.	Valid %	Total n	Pop. Est.	Valid %
Yes	180	122,569	61.1%				180	122,569	61.1%
No	93	77,962	38.9%				93	77,962	38.9%
Total	273	200,531					273	200,531	

Q28. How important is it that your child…									
	Total			Child 4-11			Child 12-19		
Response Options	Total n	Pop. Est.	Valid %	Total n	Pop. Est.	Valid %	Total n	Pop. Est.	Valid %
a. does well in math.									
Very important	546	417,885	89.7%	265	213,662	91.0%	281	204,223	88.4%
Somewhat important	58	45,425	9.8%	24	19,386	8.3%	34	26,039	11.3%
Not very important	4	2,530	.5%	3	1787	.8%	1	743	.3%
Total	608	465,840		292	234,835		316	231,005	
b. does well in science.									
Very important	481	360,280	77.5%	241	189,765	81.2%	240	170,515	73.8%
Somewhat important	114	92,248	19.9%	44	38,606	16.5%	70	53,642	23.2%
Not very important	12	12,154	2.6%	6	5,306	2.3%	6	6,848	3.0%
Total	607	464,682		291	233,678		316	231,005	
_c. has good technology skills.									
Very important	532	396,350	85.1%	264	207,137	88.2%	268	189,212	81.9%
Somewhat important	72	64,686	13.9%	24	22,894	9.7%	48	41,792	18.1%
Not very important	4	4,804	1.0%	4	4,804	2.0%	0	0	0.0%
Total	608	465,840		292	234,835		316	231,005	
d. has some exposure to engineering.									
Very important	349	263,871	56.6%	187	147,109	62.6%	162	116,762	50.5%
Somewhat important	230	179,426	38.5%	93	78,284	33.3%	137	101,142	43.8%
Not very important	29	22,543	4.8%	12	9,443	4.0%	17	13,100	5.7%
Total	608	465,840		292	234,835		316	231,005	

If child is aged 4-11, skip to Q31

Q30. How important is it that your child…									
	Total			Child 4-11			Child 12-19		
Response Options	Total n	Pop. Est.	Valid %	Total n	Pop. Est.	Valid %	Total n	Pop. Est.	Valid %
a. has some advanced math skills.									
Very important	210	145,008	63.5%				210	145,008	63.5%
Somewhat important	85	67,008	29.4%				85	67,008	29.4%
Not very important	20	16,248	7.1%				20	16,248	7.1%
Total	315	228,264					315	228,264	
b. has some advanced science skills.									
Very important	177	122,325	53.0%				177	122,325	53.0%
Somewhat important	115	86,328	37.4%				115	86,328	37.4%
Not very important	24	22,351	9.7%				24	22,351	9.7%
Total	316	231,005					316	231,005	
c. has some advanced technology skills.									
Very important	213	144,940	62.7%				213	144,940	62.7%
Somewhat important	90	69,635	30.1%				90	69,635	30.1%
Not very important	13	16,430	7.1%				13	16,430	7.1%
Total	316	231,005					316	231,005	
d. has some advanced engineering concepts.									
Very important	96	68,978	30.3%				96	68,978	30.3%
Somewhat important	178	123,201	54.2%				178	123,201	54.2%
Not very important	40	35,216	15.5%				40	35,216	15.5%
Total	314	227,395					314	227,395	

Q34. Are you…?			
	Total		
Response Options	Total n	Pop. Est.	Valid %
Male	764	1,132,723	49.0%
Female	1108	1,178,306	51.0%
Total	1872	2,311,029	

Age of Respondent			
	Total		
Response Options	Total n	Pop. Est.	Valid %
18-24 years old	122	290,857	12.8%
25-34 years old	169	399,717	17.5%
35-44 years old	349	329,193	14.4%
45-54 years old	379	377,628	16.6%
55-64 years old	347	429,686	18.9%
65 years or older	483	451,603	19.8%
Total	1849	2,278,685	

Q36 What is the highest level of education you have completed?			
	Total		
Response Options	Total n	Pop. Est.	Valid %
Less than high school graduate	83	156,449	6.8%
Grade 12 or GED (high school graduate)	486	725,315	31.5%
One or more years of college but no degree	268	357,518	15.5%
Associate's or other 2-year degree	283	396,423	17.2%
College graduate with a 4 year degree such as a BA or BS	493	484,104	21.0%
Graduate degree completed (MA MS MFA MBA MD PhD EdD etc.)	255	185,189	8.0%
Total	1,868	2,304,998	

Final Classification of Education			
	Total		
Response Options	Total n	Pop. Est.	Valid %
High School or less	569	881,764	38.3%
Some College	551	753,941	32.7%
BA or More	748	669,293	29.0%
Total	1,868	2,304,998	

Q37. Do you have a degree or some form of advanced training in a field related to science, technology, engineering, or math?			
	Total		
Response Options	Total n	Pop. Est.	Valid %
Yes	602	638,792	27.7%
No	1,264	1,667,604	72.3%
Total	1,866	2,306,397	

Q38. Which of the following best describes where you live? Do you live…			
	Total		
Response Options	Total n	Pop. Est.	Valid %
On a farm or in an open rural area	399	457,357	20.2%
In a small town of less than 5000 persons	461	491,183	21.6%
In a large town of 5000 to less than 25000 persons	317	425,302	18.7%
In a city of 25000 to less than 50000 persons	197	222,446	9.8%
In a city of 50000 or more persons	470	673,130	29.7%
Total	1,844	2,269,418	

Final Location Size Classification			
	Total		
Response Options	Total n	Pop. Est.	Valid %
Lives on a Farm/Small Town	860	948,540	41.8%
Large Town/Small City	514	647,748	28.5%
Large City	470	673,130	29.7%
Total	1,844	2,269,418	

Q39 Are you currently…?			
	Total		
Response Options	Total n	Pop. Est.	Valid %
Employed for wages	951	1,228,518	53.2%
Self-employed	194	225,875	9.8%
Out of work for more than 1 year	22	63,565	2.8%
Out of work for less than 1 year	35	51,518	2.2%
A homemaker	111	107,624	4.7%
A student	50	112,821	4.9%
Retired	441	436,042	18.9%
Unable to work	64	78,331	3.4%
REFUSED	4	6,736	.3%
Total	1,872	2,311,029	

Q40. Are you or were you recently employed in a career that significantly uses skills in science, technology, engineering, or math?			
	Total		
Response Options	Total n	Pop. Est.	Valid %
Yes	920	1,074,393	53.7%
No	716	924,908	46.3%
Total	1,636	1,999,301	

Q41. What is your annual gross household income from all sources before taxes? Is it…			
	Total		
Response Options	Total n	Pop. Est.	Valid %
Less than $15000	124	173,242	9.0%
$15000 to less than $25000	121	145,656	7.6%
$25000 to less than $35000	161	209,667	10.9%
$35000 to less than $50000	230	291,372	15.2%
$50000 to less than $75000	306	411,603	21.4%
$75000 to less than $100000	259	292,309	15.2%
$100000 to less than $150000	232	259,160	13.5%
$150000 or more	130	139,270	7.2%
Total	1,563	1,922,279	

Q41B. Can you tell if your annual gross income is less than, equal to, or greater than $50,000?			
	Total		
Response Options	Total n	Pop. Est.	Valid %
Less than $50000	76	109,074	45.8%
Equal to $50000	12	23,090	9.7%
More than $50000	87	105,970	44.5%
Total	175	238,133	

Participant Race/Ethnicity			
	Total		
Response Options	Total n	Pop. Est.	Valid %
Whites	1,646	2,051,713	91.2%
African American	79	59,602	2.7%
Others	17	35,659	1.6%
Hispanic/Latino (ALL races)	116	101,547	4.5%
Total	1,858	224,8521	

Appendix I: Statewide Student Interest Inventory_Item frequencies

ITEM 1: Engineering

E1. **How much do you like to create and build things?**
MS/HS1. **How interested are you in designing, creating, and building machines and devices (also called engineering)?**

Response Options		Scale-Up Students					All Students Statewide				
Grades 3-5	Grades 6-12	Total n	Subtotal %	Grades 3-5	Grades 6-8	Grades 9-12	Total n	Subtotal %	Grades 3-5	Grades 6-8	Grades 9-12
I like it a lot	Very interested	3,771	44.4%	65.9%	31.8%	27.8%	68,749	39.6%	64.3%	30.8%	21.3%
It's okay	Somewhat interested	3,106	36.6%	28.8%	41.5%	40.7%	62,430	35.9%	30.4%	41.3%	36.3%
I don't like it very much	Not very interested	1,616	19.0%	5.3%	26.7%	31.5%	42,569	24.5%	5.3%	27.9%	42.4%
Total		8,493					173,748				

ITEM 2: MATH

E2. **How much do you like math?**
MS/HS2. **How interested are you in math?**

Response Options		Scale-Up Students					All Students Statewide				
Grades 3-5	Grades 6-12	Total n	Subtotal %	Grades 3-5	Grades 6-8	Grades 9-12	Total n	Subtotal %	Grades 3-5	Grades 6-8	Grades 9-12
I like it a lot	Very interested	2,494	29.4%	37.9%	25.2%	19.2%	48,825	28.1%	38.2%	26.5%	18.6%
It's okay	Somewhat interested	3,719	43.9%	43.9%	44.6%	40.4%	74,524	42.9%	42.8%	44.6%	41.3%
I don't like it very much	Not very interested	2,266	26.7%	18.2%	30.3%	40.5%	50,203	28.9%	19.0%	28.9%	40.1%
Total		8,479					173,552				

ITEM 3: SCIENCE

E3. **How much do you like science?**
MS/HS3. **How interested are you in science?**

Response Options			Scale-Up Students					All Students Statewide			
Grades 3-5	Grades 6-12	Total n	Subtotal %	Grades 3-5	Grades 6-8	Grades 9-12	Total n	Subtotal %	Grades 3-5	Grades 6-8	Grades 9-12
I like it a lot	Very interested	3,242	38.3%	47.1%	33.3%	30.4%	62,551	36.1%	47.5%	32.4%	27.2%
It's okay	Somewhat interested	3,775	44.5%	41.5%	46.8%	45.0%	75,899	43.8%	40.3%	46.4%	44.9%
I don't like it very much	Not very interested	1,457	17.2%	11.4%	20.0%	24.7%	34,946	20.2%	12.2%	21.2%	27.9%
Total		8,474					173,396				

ITEM 4: ART

E3. **How much do you like science?**
MS/HS3. **How interested are you in science?**

Response Options			Scale-Up Students					All Students Statewide			
Grades 3-5	Grades 6-12	Total n	Subtotal %	Grades 3-5	Grades 6-8	Grades 9-12	Total n	Subtotal %	Grades 3-5	Grades 6-8	Grades 9-12
I like it a lot	Very interested	4,056	47.8%	68.7%	37.3%	23.4%	78,222	45.1%	65.4%	40.1%	27.8%
It's okay	Somewhat interested	2,483	29.3%	23.7%	33.2%	30.6%	53,683	31.0%	25.9%	33.4%	34.0%
I don't like it very much	Not very interested	1,939	22.9%	7.7%	29.5%	46.0%	41,463	23.9%	8.7%	26.5%	38.2%
Total		8,478					173,368				

ITEM 5: READING

E3. **How much do you like science?**
MS/HS3. **How interested are you in science?**

Response Options		Scale-Up Students					All Students Statewide				
Grades 3-5	Grades 6-12	Total n	Subtotal %	Grades 3-5	Grades 6-8	Grades 9-12	Total n	Subtotal %	Grades 3-5	Grades 6-8	Grades 9-12
I like it a lot	Very interested	2,544	30.0%	50.8%	17.9%	13.8%	51,717	29.8%	52.9%	18.0%	16.8%
It's okay	Somewhat interested	3,494	41.2%	37.4%	45.2%	35.8%	68,063	39.3%	36.2%	43.3%	38.4%
I don't like it very much	Not very interested	2,433	28.7%	11.8%	36.9%	50.5%	53,575	30.9%	11.0%	38.7%	44.8%
Total		8,471					173,355				

ITEM 6: COMPUTERS & TECHNOLOGY

E6. **How much do you like using computers and technology?**
MS/HS6. **How interested are you in computers and technology?**

Response Options		Scale-Up Students					All Students Statewide				
Grades 3-5	Grades 6-12	Total n	Subtotal %	Grades 3-5	Grades 6-8	Grades 9-12	Total n	Subtotal %	Grades 3-5	Grades 6-8	Grades 9-12
I like it a lot	Very interested	4,437	52.4%	72.1%	41.9%	32.2%	83,729	48.4%	71.9%	43.0%	27.8%
It's okay	Somewhat interested	2,879	34.0%	23.0%	39.5%	46.8%	60,682	35.1%	22.8%	38.4%	45.1%
I don't like it very much	Not very interested	1,153	13.6%	4.9%	18.6%	21.0%	28,696	16.6%	5.3%	18.6%	27.1%
Total		8,469					173,107				

ITEM 7: SOCIAL STUDIES

E7. **How much do you like social studies?**
MS/HS7. **How interested are you in social studies (such as history, American studies, or government)?**

Response Options		Scale-Up Students					All Students Statewide				
Grades 3-5	Grades 6-12	Total n	Subtotal %	Grades 3-5	Grades 6-8	Grades 9-12	Total n	Subtotal %	Grades 3-5	Grades 6-8	Grades 9-12
I like it a lot	Very interested	2,219	26.2%	27.8%	25.8%	22.4%	43,040	24.8%	26.8%	25.0%	22.5%
It's okay	Somewhat interested	3,756	44.4%	48.2%	42.3%	40.6%	73,918	42.7%	48.5%	40.6%	38.3%
I don't like it very much	Not very interested	2,487	29.4%	23.9%	31.9%	37.0%	56,263	32.5%	24.7%	34.4%	39.2%
Total		8,462					173,221				

ITEM 8: STEM CAREERS

E8. **When you grow up, how much would you like to have a job where you use science, computers, or math?**
MS/HS8. **As an adult, how interested would you be in having a job that uses skills in science, technology, math, or engineering?**

Response Options		Scale-Up Students					All Students Statewide				
Grades 3-5	Grades 6-12	Total n	Subtotal %	Grades 3-5	Grades 6-8	Grades 9-12	Total n	Subtotal %	Grades 3-5	Grades 6-8	Grades 9-12
I like it a lot	Very interested	3,536	42.3%	42.2%	42.5%	41.9%	70,408	41.3%	42.7%	42.9%	37.9%
It's okay	Somewhat interested	3,532	42.3%	40.8%	43.4%	42.3%	70,641	41.4%	40.2%	42.3%	41.8%
I don't like it very much	Not very interested	1,285	15.4%	17.0%	14.1%	15.8%	29,523	17.3%	17.1%	14.8%	20.2%
Total		8,353					170,572				

Appendix J: Regional Scale-Up Program_Teacher/Leader questionnaire

Scale-Up Teacher/Leader Survey 2013-2014

All Teacher/Leaders implementing Scale-Up programs are required to submit a report about the implementation of their Scale-Up. The general purpose of this survey is to inform the Iowa STEM Monitoring Project by providing the Monitoring Team with consistent information about all Scale-up programs implemented in the six Hub Regions. This survey should be completed by the teacher or leader who implemented the program.

The following questions will provide summative data regarding participation in your Scale-up, information about its implementation and working with the service provider, and outcomes of implementing a Scale-up program. Your responses to these questions will enable us to provide a detailed story about Iowa's STEM Scale-up programs in 2013-2014.

Please complete this survey as soon as possible after you have completed your Scale-Up program. The link will remain open until May 16, 2014. If you have questions about gathering or completing this information, please contact Mari Kemis (mrkemis@iastate.edu) or your regional hub manager.

Please enter your name.____

Please enter your school district name.________________________________

Please enter your school building name.________________________________

Please enter your email address.______________________________________

Please enter your phone number.______________________________________

I am the . . . (check all that apply)

- ❑ Scale-Up contact (person named in the application as contact)
- ❑ Scale-Up teacher (school-based)
- ❑ Scale-Up leader (non-school-based)

Are you . . .

- ❍ Male
- ❍ Female

Which subject(s) do you teach?_______________________________________

Which grade level(s) do you teach?____________________________________

Please specify the STEM region in which you are located.
❍ NW--Northwest
❍ NC--North Central
❍ NE--Northeast
❍ SW--Southwest
❍ SC--South Central
❍ SE--Southeast

Please select your Scale-Up program.
❍ A World in Motion (AWIM)
❍ Camp in a Can Show and Tell
❍ Carolina STEM Curriculum
❍ CASE--The Case for Agricultural STEM Education in Iowa
❍ Defined STEM
❍ E=HC2 Exploration = Health Careers Connection
❍ Engineering is Elementary in Iowa (EiE)
❍ HyperStream
❍ Project Lead the Way

Please indicate when you started and ended your Scale-Up program.

Scale-Up program start date	
Scale-Up program end date	

Please indicate the participants in your Scale-Up program. (Check all that apply.)
❑ K-12 students
❑ Parents
❑ Other (Please describe) ____________________

Please complete the following to describe the student participants in your program.

Total number of individual student participants	
Grade level(s) (indicate the grade or range of grades)	
Percentage male	
Percentage female	

Please complete the following to describe the parent volunteers in your program. Leave blank if no parents volunteered in your program.

Total number of individual parent volunteers Percentage male Percentage female	

Please complete the following to describe the other participants in your program. Leave blank if no others participated in your program.

Total number of individual other participants Percentage male Percentage female	

Implementation

Did you implement your Scale-Up program. . .
- ❍ as intended
- ❍ with minor changes (please describe) ____________________
- ❍ with major changes (please describe) ____________________

Please give us your opinions about working with your service provider.   To what extent...

	Not at all	Some of the time	Most of the time	All of the time
did you have adequate contact with the service provider?	❍	❍	❍	❍
did you receive materials and resources in a timely manner?	❍	❍	❍	❍
was the service provider responsive to your questions and needs?	❍	❍	❍	❍
did your partnership with the service provider meet your overall expectations?	❍	❍	❍	❍

Describe any challenges or barriers you faced in working with your service provider. [Open ended]

Describe any challenges or barriers you faced in implementing the Scale-Up program [Open ended].

What did you find helpful during the implementation and would recommend to others? This might include helpful partners, administrative support, training, or unique local circumstances [Open ended].

What groups did you collaborate with in the implementation of the Scale-Up program? Please be specific and do not use acronyms.

- ❑ In-school ____
- ❑ Out-of-school ____
- ❑ Community ____
- ❑ Volunteer ____
- ❑ Other (please describe) _____________________________________

Outcomes, Dissemination, and Sustainability

We are interested to know if you, as a teacher/leader of a Scale-Up program, have gained skills or confidence as a result of your participation. Please indicate your level of agreement with the following statements.

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree	N/A
I have more confidence to teach STEM topics.	❍	❍	❍	❍	❍	❍	❍
I have increased my knowledge of STEM topics.	❍	❍	❍	❍	❍	❍	❍
I am better prepared to answer students' questions about STEM topics.	❍	❍	❍	❍	❍	❍	❍
I have learned effective methods for teaching STEM topics.	❍	❍	❍	❍	❍	❍	❍

For your Scale-Up, did you... (check all that apply)

- ❑ Utilize a previously established school-business partnership in your area
- ❑ Develop a new school-business partnership in your area to implement your Scale-Up program
- ❑ I was unable to find either a new or existing school-business partnership to use with my Scale-Up program.
- ❑ My Scale-Up program did not require a school-business partnership.

Please indicate how many school-business partnerships you and/or your school or organization have with businesses in your area.

Total number of school-business partnerships______________________________

Number of NEW school-business partnership this school year__________________

Please describe the school-business partnership you used the most for your Scale-Up program (e.g., type of business, any activities that were the result of the partnership (field trips, guest speaker, etc.), successes/challenges/barriers of the partnership) [Open ended].

Which of the following outcomes, if any, did you observe as a result of your program? (Check all that apply.)

- ❑ Increased student awareness in STEM topics
- ❑ Increased student interest in STEM topics
- ❑ Increased student awareness in STEM career opportunities
- ❑ Increased student interest in STEM career opportunities
- ❑ Increased student achievement in STEM topics
- ❑ Increased student interest in STEM educational opportunities in college
- ❑ Utilized an existing school-business partnership
- ❑ Developed a new school-business partnership
- ❑ Other (please describe) ____________________

Please provide one or two examples of the impact the program has had on participants. [Open ended]

Did the outcomes you observed meet your expectations?

- ❑ Yes (how?) ____
- ❑ No (why not?) ____

Please describe anything unexpected that happened during implementation or any unexpected results (positive or negative). [Open ended]

At the local level, was there.....(Check all that apply.)

- ❑ Media coverage for your program
- ❑ Community support
- ❑ Support from business and industry
- ❑ Additional funding or other resources from partners
- ❑ Local interest in continuing STEM programming

Thank you so much for your responses. Please click on the >> to submit your responses.

Appendix K: Regional Scale-Up Program_Description of 2013-2014 Scale-Up Programs

Prepared by Research Institute for Studies in Education (RISE), Iowa State University

Source: http://www.iowastem.gov/2013-2014-stem-scale-programs#overlay-context=stem-program-scale-call-applications-0 (Retrieved July 2014)

A World in Motion (AWIM)
Description: The AWIM program combines a comprehensive curriculum built around the Engineering Design Experience and requires students work in teams, through the problem solving process, to solve a "challenge" to design, build and test a vehicle, and then defend their design though a presentation.
Grade Level: PreK - 8
Contact: Chris Ciuca, SAE Foundation – cciuca@sae.org
For More Information: www.awim.org

Camp in a Can Show & Tell*
Description: Camp in a Can Show & Tell (CIACS&T) is an exciting, hands-on, all inclusive nature curriculum, professional development workshop and live animal presentation designed for after school and out-of-school time programs.
Grade Level: PreK - 6
Contact: Monica Post, Camp in a Can Foundation – monica@campinacan.com
For More Information: www.CampinaCan.com

Carolina STEM Curriculum*
Description: The Carolina STEM Curriculum provides students with a curricula to fully address science and Common Core standards and to develop a STEM foundation by providing opportunities for engaging with natural phenomena, technology, engineering design challenges and mathematics. Students develop 21st-century, age-appropriate scientific habits while building on prior knowledge and experiences, allowing them to apply problem-solving strategies to real-world problems.
Grade Level: PreK - 8
Contact: Dylan Briggs, Carolina Biological Supply Company – dylan.briggs@carolina.com
For More Information: www.carolina.com/iowastem
Carolina STEM Curriculum Video

CASE – The "CASE" for Agricultural STEM Education in Iowa: Preparing Tomorrow's Leaders, Today
Description: CASE (Curriculum for Agriscience Education) hopes to increase STEM awareness and rigor and relevance of agriculture, food and natural resource subject matter through teacher professional development, student exposure to technology and a curriculum infused with 21st century skills, critical thinking and practice opportunities.
Grade Level: 9 -12
Contact: Joshua Remington, Iowa FFA Foundation – joshua.remington@iowaffafoundation.org
For More Information: www.iowaffafoundation.org

Defined STEM*

Description: Defined STEM is a web-based application designed to promote rigorous and relevant connections between classroom content and real-world applications. Defined STEM re-defines STEM education by providing a context for learning and an authentic environment for students to apply content knowledge through role-based, multidisciplinary performance tasks and literacy tasks.
Grade Level: 3 -12
Contact: Johnjoe Farragher, Defined Learning, LLC – johnjoe_farragher@definedlearning.com
For More Information: www.definedstem.com

E=HC² Exploration = Health Careers Connection*

Description: E=HC² Exploration = Health Careers Connection is a STEM-based curricular intervention
that integrates academic and vocational opportunities designed to connect minority and low socioeconomic middle and high school students to the health science professions through classroom and club activities, work-based learning opportunities, and health science career mentoring.
Grade Level: 8-12
Contact: Saba Rasheed Ali, Ph.D., University of Iowa, saba-ali@uiowa.edu

Engineering is Elementary in Iowa (EiE)

Description: The Engineering is Elementary (EiE) is a research-based, standards-driven, and classroom-tested curriculum that integrates engineering and technology concepts and skills with elementary science topics.
Grade Level: 1-5
Contact: Christopher Soldat, Grant Wood AEA Van Allen Science Teaching Center – csoldat@gwaea.org
For More Information: www.aea10.k12.ia.us/vastscience/curriculumnew.html

HyperStream - Technology Hub for Iowa Students

Description: HyperStream is a program that partners education and business, combines a career awareness initiative with hands-on, real-world tech projects that students choose and develop through project-based learning.
Grade Level: 6-12
Contact: Tamara Kenworthy, Program Manager, Technology Association of Iowa (TAI) – tamara@technologyiowa.org
For More Information: http://hyperstream.org or click here

Project Lead The Way: Gateway to Technology Program*

Description: Project Lead The Way (PLTW) intends to use the Gateway to Technology Program to promote critical thinking, creativity, innovation, and real-world problem solving skills in students.
Grade Level: 6 - 8
Contact: Kimberly Glenn, Director of School Engagement-West Central Region (Iowa & Nebraska)
kglenn@pltw.org, 515-231-2440
For More Information: www.pltw.org or click here.

**** - New STEM Scale-Up Programs for 2013-2014***

Appendix L: Regional Scale-Up Program_List of 2013-2014 Scale-Up Program participants

Prepared by Research Institute for Studies in Education (RISE), Iowa State University

Source: http://www.iowastem.gov/2013-14-scale-programs (Retrieved July 2014)

2013-14 Scale-Up Programs

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
North Central	Ames	Ames Homeschool Assistance Program	A World in Motion
North Central	Ames	Youth and Shelter Services Kids Club	A World in Motion
North Central	Barnum	Manson Northwest Webster Elementary School	A World in Motion
North Central	Forest City	Forest City Middle School	A World in Motion
North Central	Gilbert	Gilbert Community School District	A World in Motion
North Central	Gilbert	Gilbert Elementary	A World in Motion
North Central	Gilbert	Gilbert Elementary	A World in Motion
North Central	Grundy Center	Grundy Center Community School District	A World in Motion
North Central	Mason City	North Iowa Area Community College	A World in Motion
North Central	Zearing	Colo-Nesco	A World in Motion
North Central	Alden	Dr. Grace O. Doane Alden Public Library	Camp in a Can
North Central	Fort Dodge	Butler BLAST Afterschool Program	Camp in a Can
North Central	Fort Dodge	Girl Scouts Greater Iowa	Camp in a Can
North Central	Fort Dodge	St. Edmond Catholic School Inc	Camp in a Can
North Central	Mason City	Girl Scouts of Greater Iowa	Camp in a Can
North Central	Mason City	Iowa State University Extension and Outreach	Camp in a Can
North Central	Nevada	Story County ISU Extension & Outreach	Camp in a Can
North Central	Thompson	Winnebago County- ISU Extension and Outreach	Camp in a Can
North Central	Ames	Gilbert Elementary	Carolina STEM
North Central	Aplington	Aplington Parkersburg Middle School	Carolina STEM Curriculum
North Central	Buffalo Center	North Iowa Community School	Carolina STEM Curriculum
North Central	Buffalo Center	North Iowa Elementary School	Carolina STEM Curriculum
North Central	Fort Dodge	St. Edmond Catholic School Inc	Carolina STEM Curriculum
North Central	Gilbert	Gilbert Community School District	Carolina STEM Curriculum
North Central	Gilbert	Gilbert Elementary	Carolina STEM Curriculum
North Central	Gilbert	Gilbert Elementary	Carolina STEM

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
			Curriculum
North Central	Gilbert	Gilbert Elementary	Carolina STEM Curriculum
North Central	Gilbert	Gilbert Elementary	Carolina STEM Curriculum
North Central	Gilbert	Gilbert Elementary	Carolina STEM Curriculum
North Central	Gilbert	Gilbert Elementary	Carolina STEM Curriculum
North Central	Gilbert	Gilbert Elementary	Carolina STEM Curriculum
North Central	Gilbert	Gilbert Elementary	Carolina STEM Curriculum
North Central	Gilbert	Gilbert Elementary	Carolina STEM Curriculum
North Central	Gilbert	Gilbert Elementary	Carolina STEM Curriculum
North Central	Gilbert	Gilbert Elementary	Carolina STEM Curriculum
North Central	Gilbert	Gilbert Middle School	Carolina STEM Curriculum
North Central	Grundy Center	Grundy Center Middle School	Carolina STEM Curriculum
North Central	Mason City	Lincoln Intermediate School	Carolina STEM Curriculum
North Central	Roland	Roland-Story Middle School	Carolina STEM Curriculum
North Central	Algona	Algona Agriculture Education	Curriculum for Agriscience Education (CASE)
North Central	Boone	Boone Agricultural Education Department	Curriculum for Agriscience Education (CASE)
North Central	Buffalo Center	North Iowa Agriculture Education	Curriculum for Agriscience Education (CASE)
North Central	Colo	Colo-NESCO Community School District	Curriculum for Agriscience Education (CASE)
North Central	Garner	Garner-Hayfield / Ventura High School	Curriculum for Agriscience Education (CASE)
North Central	Grundy Center	Grundy Center Agriculture Education	Curriculum for Agriscience Education (CASE)
North Central	Hampton	Hampton-Dumont Community School District	Curriculum for Agriscience

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
			Education (CASE)
North Central	Parkersburg	Aplington-Parkersburg High School	Curriculum for Agriscience Education (CASE)
North Central	Sheffield	West Fork Community School District	Curriculum for Agriscience Education (CASE)
North Central	State Center	West Marshall High School	Curriculum for Agriscience Education (CASE)
North Central	Alden	Alden Elementary	Defined STEM
North Central	Boone	Boone Elementary	Defined STEM
North Central	Boone	Boone High School	Defined STEM
North Central	Boone	Boone High School	Defined STEM
North Central	Buffalo Center	North Iowa Elementary School	Defined STEM
North Central	Clear Lake	Clear Creek Elementary	Defined STEM
North Central	Conrad	BCLUW High School	Defined STEM
North Central	Forest City	Forest City Middle School	Defined STEM
North Central	Fort Dodge	Fort Dodge Community Schools	Defined STEM
North Central	Hubbard	South Hardin Middle School	Defined STEM
North Central	Iowa Falls	Iowa Falls-Alden High School	Defined STEM
North Central	Iowa Falls	Riverbend Middle School	Defined STEM
North Central	Iowa Falls	Rock Run Elementary	Defined STEM
North Central	Manly	Central Springs Community School District	Defined STEM
North Central	Marshalltown	Collaboration/Partnership-Howgan SCC & Marshalltown School District/MCC	Defined STEM
North Central	Mason City	Lincoln Intermediate School	Defined STEM
North Central	Mason City	Mason City High School	Defined STEM
North Central	Webster City	Webster City High School	Defined STEM
North Central	Zearing	Colo-Nesco	Defined STEM
North Central	Ames	Iowa Home School / Ames CSD	Defined STEM
North Central	Marshalltown	Marshalltown Community School	Defined STEM
North Central	Clear Lake	Clear Creek Elementary	Engineering is Elementary
North Central	Gilbert	Gilbert Community School District	Engineering is Elementary
North Central	Gilbert	Gilbert CSD	Engineering is Elementary
North Central	Gilbert	Gilbert Elementary	Engineering is Elementary
North Central	Gilbert	Gilbert Elementary	Engineering is Elementary
North Central	Gilbert	Gilbert Elementary	Engineering is Elementary

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
North Central	Gilbert	Gilbert Elementary	Engineering is Elementary
North Central	Gilbert	Gilbert Elementary	Engineering is Elementary
North Central	Mason City	North Iowa Area Community College	Engineering is Elementary
North Central	Gowrie	Prairie Valley Jr. /Sr. High School	Health Careers Connection
North Central	Holland	Cedar Valley West	Health Careers Connection
North Central	Mason City	Mason City High School	Health Careers Connection
North Central	Mason City	Mason City High School	Health Careers Connection
North Central	Boone	Iowa State University Extension and Outreach-Region 8	HyperStream
North Central	Boone	Iowa State University Extension and Outreach-Region 8	HyperStream
North Central	Boone	United Community Schools	HyperStream
North Central	Hampton	Hampton-Dumont High School	HyperStream
North Central	Marshalltown	Marshalltown High School	HyperStream
North Central	Mason City	Lincoln Intermediate School	HyperStream
North Central	Mason City	North Iowa Area Community College	HyperStream
North Central	State Center	West Marshall High School	HyperStream
North Central	Charles City	Charles City Community School District	PLTW Gateway to Technology
North Central	Manson	Manson Northwest Webster Community School District	PLTW Gateway to Technology
North Central	Marshalltown	Marshalltown Community School	PLTW Gateway to Technology
North Central	Nevada	Nevada Middle School	PLTW Gateway to Technology
North Central	Ogden	Ogden Middle School	PLTW Gateway to Technology
North Central	State Center	West Marshall Middle School	PLTW Gateway to Technology
Northeast	Cedar Falls	St. Patrick School	A World in Motion
Northeast	Cresco	Crestwood Junior High School	A World in Motion
Northeast	Cresco	Notre Dame School	A World in Motion
Northeast	Decorah	Decorah Community School District	A World in Motion
Northeast	Dubuque	Girl Scouts of Eastern Iowa and Western Illinois	A World in Motion
Northeast	Dubuque	St. Anthony School/Holy Family System	A World in Motion
Northeast	Elkader	Central Community School	A World in Motion
Northeast	Farley	Drexler Middle School	A World in Motion

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
Northeast	Farley	Western Dubuque TAG Program	A World in Motion
Northeast	Janesville	Janesville Community School District Talented and Gifted	A World in Motion
Northeast	Jesup	Jesup Middle School	A World in Motion
Northeast	Lime Springs	Lime Springs-Chester Elementary School	A World in Motion
Northeast	Oelwein	Oelwein Community Schools	A World in Motion
Northeast	Ossian	South Winneshiek Elementary/Middle School	A World in Motion
Northeast	Riceville	Riceville Elementary School	A World in Motion
Northeast	Waterloo	Girl Scouts of Eastern Iowa and Western Illinois	A World in Motion
Northeast	Waterloo	Waterloo Community Schools	A World in Motion
Northeast	Wyoming	Midland Community School District	A World in Motion
Northeast	Bellevue	St. Joe's Daycare	Camp in a Can
Northeast	Dubuque	Dubuque County Extension - Iowa State University and Outreach	Camp in a Can
Northeast	IA	Iowa State University and Outreach- Fayette County Extension	Camp in a Can
Northeast	Monticello	Carpenter Elementary School	Camp in a Can
Northeast	Monticello	Iowa State University Extension	Camp in a Can
Northeast	New Hampton	Chickasaw County 4-H	Camp in a Can
Northeast	Oelwein	Oelwein Community Schools	Camp in a Can
Northeast	Waterloo	ISU Extension & Outreach- Region 9 c/o Black Hawk Co. Extension	Camp in a Can
Northeast	Bellevue	Marquette Catholic Schools	Carolina STEM Curriculum
Northeast	Bellevue	Marquette Catholic Schools	Carolina STEM Curriculum
Northeast	Bellevue	Marquette Catholic Schools	Carolina STEM Curriculum
Northeast	Bellevue	Marquette Catholic Schools	Carolina STEM Curriculum
Northeast	Bellevue	Marquette Catholic Schools	Carolina STEM Curriculum
Northeast	Bellevue	Marquette Catholic Schools	Carolina STEM Curriculum
Northeast	Bellevue	Marquette Catholic Schools	Carolina STEM Curriculum
Northeast	Dubuque	Dubuque Community School District	Carolina STEM Curriculum
Northeast	Dubuque	Dubuque Community School District	Carolina STEM Curriculum
Northeast	Dubuque	Dubuque Community School District	Carolina STEM Curriculum
Northeast	Dubuque	Dubuque Community School District	Carolina STEM Curriculum

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
Northeast	*Dubuque*	*Dubuque Community School District*	*Carolina STEM Curriculum*
Northeast	*Dubuque*	*Dubuque Community School District*	*Carolina STEM Curriculum*
Northeast	*Grundy Center*	*Grundy Center Middle School*	*Carolina STEM Curriculum*
Northeast	*Janesville*	*Janesville Consolidated School District*	*Carolina STEM Curriculum*
Northeast	*Janesville*	*Janesville Elementary School*	*Carolina STEM Curriculum*
Northeast	*Janesville*	*Janesville Elementary School*	*Carolina STEM Curriculum*
Northeast	*Janesville*	*Janesville Elementary School*	*Carolina STEM Curriculum*
Northeast	*Manchester*	*West Delaware Community School District*	*Carolina STEM Curriculum*
Northeast	*Maquoketa*	*Maquoketa Middle School*	*Carolina STEM Curriculum*
Northeast	*Maquoketa*	*Maquoketa Middle School*	*Carolina STEM Curriculum*
Northeast	*Miles*	*East Central Community School District*	*Carolina STEM Curriculum*
Northeast	*New Hampton*	*New Hampton Elementary*	*Carolina STEM Curriculum*
Northeast	*New Hampton*	*New Hampton Elementary*	*Carolina STEM Curriculum*
Northeast	*New Hampton*	*New Hampton Elementary*	*Carolina STEM Curriculum*
Northeast	*New Hampton*	*New Hampton Elementary*	*Carolina STEM Curriculum*
Northeast	*New Hampton*	*New Hampton Elementary*	*Carolina STEM Curriculum*
Northeast	*Oelwein*	*Oelwein Community Schools*	*Carolina STEM Curriculum*
Northeast	*Oelwein*	*Wings Park Elementary*	*Carolina STEM Curriculum*
Northeast	*Oelwein*	*Wings Park Elementary*	*Carolina STEM Curriculum*
Northeast	*Oxford Junction*	*Midland Community School District*	*Carolina STEM Curriculum*
Northeast	*Oxford Junction*	*Midland Community School District*	*Carolina STEM Curriculum*
Northeast	*Oxford Junction*	*Midland Community School District*	*Carolina STEM Curriculum*
Northeast	*Oxford Junction*	*Midland Community School District*	*Carolina STEM Curriculum*

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
Northeast	Preston	Preston Community Schools	Carolina STEM Curriculum
Northeast	Preston	Preston Community Schools	Carolina STEM Curriculum
Northeast	Preston	Preston Elementary School	Carolina STEM Curriculum
Northeast	Preston	Preston Community Schools	Carolina STEM Curriculum
Northeast	Preston	Preston Community Schools	Carolina STEM Curriculum
Northeast	Preston	Preston Community Schools	Carolina STEM Curriculum
Northeast	Preston	Preston Community Schools	Carolina STEM Curriculum
Northeast	Winthrop	East Buchanan Elementary	Carolina STEM Curriculum
Northeast	Bellevue	Bellevue High School	Curriculum for Agriscience Education (CASE)
Northeast	Calmar	South Winneshiek HS Agriculture	Curriculum for Agriscience Education (CASE)
Northeast	Decorah	Decorah High School	Curriculum for Agriscience Education (CASE)
Northeast	Fairbank	Wapsie Valley Community School District	Curriculum for Agriscience Education (CASE)
Northeast	Independence	Independence Agriculture Education	Curriculum for Agriscience Education (CASE)
Northeast	Monona	MFL MarMac Agriculture Department	Curriculum for Agriscience Education (CASE)
Northeast	Nashua	Nashua Plainfield Agriculture Education	Curriculum for Agriscience Education (CASE)
Northeast	New Hampton	New Hampton Agricultural Education Program	Curriculum for Agriscience Education (CASE)
Northeast	Oelwein	Oelwein Agricultural Education Department	Curriculum for Agriscience Education (CASE)
Northeast	Reinbeck	Gladbrook-Reinbeck High School	Curriculum for Agriscience Education (CASE)
Northeast	Riceville	Riceville Community School	Curriculum for

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
			Agriscience Education (CASE)
Northeast	Sumner	Sumner-Fredericksburg Agriculture Education	Curriculum for Agriscience Education (CASE)
Northeast	Andrew	Andrew Community School	Defined STEM
Northeast	Cedar Falls	Cedar Falls Community School District	Defined STEM
Northeast	New Hartford	Dike-New Hartford Community School District	Defined STEM
Northeast	Preston	Preston Community Schools	Defined STEM
Northeast	Winthrop	East Buchanan Community School	Defined STEM
Northeast	Cresco	Crestwood Elementary	Engineering is Elementary
Northeast	Cresco	Howard-Winneshiek Community School District	Engineering is Elementary
Northeast	Cresco	Notre Dame School	Engineering is Elementary
Northeast	Janesville	Janesville Elementary School	Engineering is Elementary
Northeast	Oelwein	Oelwein Community Schools	Engineering is Elementary
Northeast	Oelwein	Oelwein Community Schools	Engineering is Elementary
Northeast	Waukon	Allamakee County Extension/4-H	Engineering is Elementary
Northeast	Cascade	Aquin Catholic School	HyperStream
Northeast	Cedar Falls	Cedar Falls Community School District	HyperStream
Northeast	Cedar Falls	Cedar Falls Community School District	HyperStream
Northeast	Cedar Falls	Cedar Falls Community School District	HyperStream
Northeast	Cedar Falls	Cedar Falls Community School District	HyperStream
Northeast	Clarence	North Cedar Extended Learning Program	HyperStream
Northeast	Des Moines	Iowa Jobs for Americas Graduates	HyperStream
Northeast	Des Moines	Iowa Jobs for America's Graduates	HyperStream
Northeast	Elkader	ISU Extension and Outreach	HyperStream
Northeast	Farley	Drexler Middle Intermediate School	HyperStream
Northeast	Monticello	Monticello Middle School	HyperStream
Northeast	Tripoli	Tripoli Community Schools	HyperStream
Northeast	Waterloo	University of Northern Iowa Talent Search Program	HyperStream
Northeast	Waterloo	Winnebago Council, Boy Scouts of America	HyperStream
Northeast	Cedar Falls	Cedar Falls Community School District	PLTW Gateway to Technology
Northeast	Cresco	Crestwood Junior High School	PLTW Gateway to Technology
Northeast	Delhi	Maquoketa Valley Middle School	PLTW Gateway to

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
			Technology
Northeast	Guttenberg	Clayton Ridge High School	PLTW Gateway to Technology
Northeast	Lansing	Middle School	PLTW Gateway to Technology
Northeast	Nashua	Nashua-Plainfield High School	PLTW Gateway to Technology
Northeast	Waukon	Waukon Junior High	PLTW Gateway to Technology
Northeast	Winthrop	East Buchanan Community Schools	PLTW Gateway to Technology
Northwest	Akron	Akron-Westfield First Grade	A World in Motion
Northwest	Akron	Akron-Westfield First Grade	A World in Motion
Northwest	Alton	MOC-Floyd Valley Community School District	A World in Motion
Northwest	Battle Creek	BCIG Intermediate School	A World in Motion
Northwest	Battle Creek	Northwest AEA	A World in Motion
Northwest	Bronson	Lawton-Bronson Community School	A World in Motion
Northwest	Bronson	Lawton-Bronson Community School	A World in Motion
Northwest	Bronson	Lawton-Bronson Elementary	A World in Motion
Northwest	Carroll	Iowa State University Extension & Outreach-Carroll County 4-H	A World in Motion
Northwest	Early	Ridge View Middle School	A World in Motion
Northwest	Emmetsburg	Emmetsburg Middle School	A World in Motion
Northwest	Emmetsburg	West Elementary	A World in Motion
Northwest	Emmetsburg	West Elementary	A World in Motion
Northwest	Hull	Boyden-Hull Gifted and Talented	A World in Motion
Northwest	Hull	Hull Christian School	A World in Motion
Northwest	Ireton	West Sioux Community Schools	A World in Motion
Northwest	Ireton	West Sioux Community Schools	A World in Motion
Northwest	Ireton	West Sioux Community Schools	A World in Motion
Northwest	Ireton	West Sioux Community Schools	A World in Motion
Northwest	Ireton	West Sioux Community Schools	A World in Motion
Northwest	Ireton	West Sioux Community Schools	A World in Motion
Northwest	Jefferson	Greene County Extension	A World in Motion
Northwest	Kingsley	Lawton-Bronson Community School	A World in Motion
Northwest	Le Mars	Le Mars Middle School	A World in Motion
Northwest	Le Mars	Plymouth County Extension	A World in Motion
Northwest	Newell	Newell-Fonda Talented and Gifted	A World in Motion
Northwest	Odebolt	OA Talented & Gifted Elementary (Grades 3-5)	A World in Motion
Northwest	Odebolt	OA-BCIG Talented & Gifted Middle School (6-8)	A World in Motion
Northwest	Onawa	West Monona Community School District	A World in Motion
Northwest	Orange City	Iowa State University Extension and Outreach-Sioux County	A World in Motion

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
Northwest	*Orange City*	*ISU Extension and Outreach*	*A World in Motion*
Northwest	*Orange City*	*ISU Extension and Outreach*	*A World in Motion*
Northwest	*Orange City*	*Orange City Elementary-5th grade Science*	*A World in Motion*
Northwest	*Primghar*	*Iowa State University Extension & Outreach*	*A World in Motion*
Northwest	*Sac City*	*East Sac Middle School*	*A World in Motion*
Northwest	*Sheldon*	*St. Patrick's School*	*A World in Motion*
Northwest	*Sibley*	*Sibley-Ocheyedan CSD/Sibley STEM Program*	*A World in Motion*
Northwest	*Spencer*	*ISU Extension- Clay County*	*A World in Motion*
Northwest	*Spencer*	*ISU Extension- Clay County*	*A World in Motion*
Northwest	*Spencer*	*Johnson Elementary School*	*A World in Motion*
Northwest	*Spirit Lake*	*Spirit Lake Elementary School*	*A World in Motion*
Northwest	*Westside*	*Ar-We-Va Community School District*	*A World in Motion*
Northwest	*Boyden*	*Boyden-Hull Comm.School District*	*Carolina STEM Curriculum*
Northwest	*Boyden*	*Boyden-Hull Elementary*	*Carolina STEM Curriculum*
Northwest	*Boyden*	*Boyden-Hull Elementary School*	*Carolina STEM Curriculum*
Northwest	*Carroll*	*Kuemper Catholic Middle School*	*Carolina STEM Curriculum*
Northwest	*Cherokee*	*Cherokee Middle School*	*Carolina STEM Curriculum*
Northwest	*Correctionville*	*River Valley Elementary School*	*Carolina STEM Curriculum*
Northwest	*Denison*	*Denison Community Schools*	*Carolina STEM Curriculum*
Northwest	*Emmetsburg*	*Emmetsburg Catholic School*	*Carolina STEM Curriculum*
Northwest	*Emmetsburg*	*Emmetsburg Catholic School*	*Carolina STEM Curriculum*
Northwest	*Emmetsburg*	*Emmetsburg Catholic School*	*Carolina STEM Curriculum*
Northwest	*Emmetsburg*	*Emmetsburg Catholic School*	*Carolina STEM Curriculum*
Northwest	*Emmetsburg*	*Emmetsburg Catholic School*	*Carolina STEM Curriculum*
Northwest	*Emmetsburg*	*Emmetsburg Catholic School*	*Carolina STEM Curriculum*
Northwest	*Emmetsburg*	*West Elementary*	*Carolina STEM Curriculum*
Northwest	*Hawarden*	*West Sioux Elementary School*	*Carolina STEM Curriculum*
Northwest	*Hinton*	*Hinton Community School*	*Carolina STEM Curriculum*

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
Northwest	Hull	Boyden-Hull Elementary	Carolina STEM Curriculum
Northwest	Ida Grove	BCIG Schools	Carolina STEM Curriculum
Northwest	Ireton	West Sioux Community Schools	Carolina STEM Curriculum
Northwest	Ireton	West Sioux Community Schools	Carolina STEM Curriculum
Northwest	Ireton	West Sioux Community Schools	Carolina STEM Curriculum
Northwest	Onawa	West Monona Elementary	Carolina STEM Curriculum
Northwest	Onawa	West Monona Middle School	Carolina STEM Curriculum
Northwest	Sergeant Bluff	Sergeant Bluff - Luton Community School District	Carolina STEM Curriculum
Northwest	Sergeant Bluff	Sergeant Bluff - Luton Community School District	Carolina STEM Curriculum
Northwest	Sergeant Bluff	Sergeant Bluff - Luton Community School District	Carolina STEM Curriculum
Northwest	Sergeant Bluff	Sergeant Bluff - Luton Community School District	Carolina STEM Curriculum
Northwest	Sergeant Bluff	Sergeant Bluff - Luton Community School District	Carolina STEM Curriculum
Northwest	Sergeant Bluff	Sergeant Bluff - Luton Community School District	Carolina STEM Curriculum
Northwest	Sergeant Bluff	Sergeant Bluff-Luton Elementary	Carolina STEM Curriculum
Northwest	Sergeant Bluff	Sergeant Bluff-Luton Elementary	Carolina STEM Curriculum
Northwest	Sergeant Bluff	Sergeant Bluff-Luton Elementary	Carolina STEM Curriculum
Northwest	Sergeant Bluff	Sergeant Bluff-Luton Elementary	Carolina STEM Curriculum
Northwest	Sergeant Bluff	Sergeant Bluff-Luton Elementary	Carolina STEM Curriculum
Northwest	Sergeant Bluff	Sergeant Bluff-Luton Elementary	Carolina STEM Curriculum
Northwest	Sioux City	Northwest AEA	Carolina STEM Curriculum
Northwest	Sioux City	East Middle School	Carolina STEM Curriculum
Northwest	Sioux City	East Middle School	Carolina STEM Curriculum
Northwest	Sioux City	East Middle School	Carolina STEM Curriculum

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
Northwest	Sioux City	East Middle School	Carolina STEM Curriculum
Northwest	Sioux City	East Middle School	Carolina STEM Curriculum
Northwest	Sioux City	East Middle School	Carolina STEM Curriculum
Northwest	Sioux City	East Middle School	Carolina STEM Curriculum
Northwest	Sioux City	East Middle School	Carolina STEM Curriculum
Northwest	Sioux City	North High School	Carolina STEM Curriculum
Northwest	Sioux City	North Middle School	Carolina STEM Curriculum
Northwest	Sioux City	North Middle School	Carolina STEM Curriculum
Northwest	Sioux City	North Middle School	Carolina STEM Curriculum
Northwest	Sioux City	North Middle School	Carolina STEM Curriculum
Northwest	Sioux City	North Middle School	Carolina STEM Curriculum
Northwest	Sioux City	North Middle School	Carolina STEM Curriculum
Northwest	Sioux City	West Middle School	Carolina STEM Curriculum
Northwest	Sioux City	West Middle School	Carolina STEM Curriculum
Northwest	Sioux City	West Middle School	Carolina STEM Curriculum
Northwest	Sioux City	West Middle School	Carolina STEM Curriculum
Northwest	Sioux City	West Middle School	Carolina STEM Curriculum
Northwest	Sioux City	West Middle School	Carolina STEM Curriculum
Northwest	Sioux City	North Middle School	Carolina STEM Curriculum
Northwest	Spirit Lake	Spirit Lake Community School District	Carolina STEM Curriculum
Northwest	Spirit lake	Spirit Lake Elementary School	Carolina STEM Curriculum
Northwest	Storm Lake	Storm Lake Middle School	Carolina STEM Curriculum
Northwest	Washta	River Valley Elementary School	Carolina STEM Curriculum

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
Northwest	Washta	River Valley Schools	Carolina STEM Curriculum
Northwest	Hull	Western Christian High School	Curriculum for Agriscience Education (CASE)
Northwest	Lake park	Harris-Lake Park Community School District	Curriculum for Agriscience Education (CASE)
Northwest	Le Mars	Le Mars Community Ag Ed Dept	Curriculum for Agriscience Education (CASE)
Northwest	Milford	Okoboji High school	Curriculum for Agriscience Education (CASE)
Northwest	Royal	Clay Central-Everly School District	Curriculum for Agriscience Education (CASE)
Northwest	Sioux Center	Sioux Center Agriculture Education	Curriculum for Agriscience Education (CASE)
Northwest	Arnolds Park	Okoboji Middle School	Defined STEM
Northwest	Cherokee	Cherokee Middle School	Defined STEM
Northwest	George	George-Little Rock High School	Defined STEM
Northwest	George	George-Little Rock High School	Defined STEM
Northwest	George	George-Little Rock High School	Defined STEM
Northwest	Hawarden	West Sioux High School	Defined STEM
Northwest	Hull	Western Christian High School	Defined STEM
Northwest	Ida Grove	OA BCIG High School	Defined STEM
Northwest	Ida Grove	OA-BCIG High School	Defined STEM
Northwest	Lake Park	Harris-Lake Park Elementary School	Defined STEM
Northwest	Lake Park	Harris-Lake Park Community School District	Defined STEM
Northwest	Lawton	Lawton-Bronson Jr./Sr. High School	Defined STEM
Northwest	Le Mars	Kluckhohn Elementary/ LeMars Community School	Defined STEM
Northwest	Le Mars	Le Mars Community High School	Defined STEM
Northwest	LeMars	LeMars Community School District	Defined STEM
Northwest	Mapleton	Maple Valley-Anthon Oto Community School District	Defined STEM
Northwest	Mapleton	Maple Valley-Anthon Oto Community School District	Defined STEM
Northwest	Mapleton	MVAO Community School District	Defined STEM
Northwest	Milford	Okoboji High School	Defined STEM
Northwest	Moville	Woodbury Central Community School District	Defined STEM
Northwest	Newell	PK-8 Newell-Fonda	Defined STEM

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
Northwest	*Orange City*	*MOC-Floyd Valley Community School District*	*Defined STEM*
Northwest	*Ruthven*	*Ruthven-Ayrshire*	*Defined STEM*
Northwest	*Sergeant Bluff*	*Sergeant Bluff-Luton Elementary*	*Defined STEM*
Northwest	*Sibley*	*Sibley-Ocheyedan Elem School*	*Defined STEM*
Northwest	*Sioux Center*	*Sioux Center High School*	*Defined STEM*
Northwest	*Sioux Center*	*Sioux Center Middle School*	*Defined STEM*
Northwest	*Sioux City*	*Bishop Heelan High School*	*Defined STEM*
Northwest	*Sioux City*	*Northwest AEA*	*Defined STEM*
Northwest	*Sioux City*	*East High School*	*Defined STEM*
Northwest	*Sioux City*	*East Middle School*	*Defined STEM*
Northwest	*Sioux City*	*North High School*	*Defined STEM*
Northwest	*Sioux City*	*North Middle School*	*Defined STEM*
Northwest	*Sioux City*	*West High School*	*Defined STEM*
Northwest	*Sioux City*	*West Middle School*	*Defined STEM*
Northwest	*Sioux City*	*West Middle School*	*Defined STEM*
Northwest	*Sioux City*	*Whittier Elementary*	*Defined STEM*
Northwest	*Sloan*	*Westwood Community Schools*	*Defined STEM*
Northwest	*Spencer*	*Spencer Community Schools*	*Defined STEM*
Northwest	*Spirit Lake*	*Spirit Lake Community School District*	*Defined STEM*
Northwest	*Terril*	*Graettinger-Terril Community Schools*	*Defined STEM*
Northwest	*Terril*	*Graettinger-Terril Community Schools*	*Defined STEM*
Northwest	*West Bend*	*West Bend-Mallard Community School District*	*Defined STEM*
Northwest	*Westside*	*Ar-We-Va Community School District*	*Defined STEM*
Northwest	*Bronson*	*Lawton-Bronson Elementary*	*Engineering is Elementary*
Northwest	*Bronson*	*Lawton-Bronson Elementary School*	*Engineering is Elementary*
Northwest	*Carroll*	*Iowa State University Extension & Outreach-Carroll County 4-H*	*Engineering is Elementary*
Northwest	*Emmetsburg*	*West Elementary*	*Engineering is Elementary*
Northwest	*Ireton*	*West Sioux Community Schools*	*Engineering is Elementary*
Northwest	*Ireton*	*West Sioux Community Schools*	*Engineering is Elementary*
Northwest	*Ireton*	*West Sioux Community Schools*	*Engineering is Elementary*
Northwest	*Kingsley*	*Kingsley-Pierson Elementary School*	*Engineering is Elementary*
Northwest	*Lake Park*	*Harris-Lake Park Elementary School*	*Engineering is Elementary*
Northwest	*Lake Park*	*Harris-Lake Park Elementary School*	*Engineering is Elementary*

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
Northwest	*Lake Park*	*Harris-Lake Park Elementary School*	*Engineering is Elementary*
Northwest	*Lake Park*	*Harris-Lake Park Elementary School*	*Engineering is Elementary*
Northwest	*Lake Park*	*Harris-Lake Park Elementary School*	*Engineering is Elementary*
Northwest	*Lake Park*	*Harris-Lake Park Elementary School*	*Engineering is Elementary*
Northwest	*Lake Park*	*Harris-Lake Park Elementary School*	*Engineering is Elementary*
Northwest	*Marcus*	*Marcus-Meridan-Cleghorn Community School District*	*Engineering is Elementary*
Northwest	*Newell*	*TAG grades 2-3*	*Engineering is Elementary*
Northwest	*Onawa*	*Monona County Extension*	*Engineering is Elementary*
Northwest	*Orange City*	*Iowa State University Extension and Outreach, Sioux County*	*Engineering is Elementary*
Northwest	*Orange City*	*MOC-Floyd Valley Community School District*	*Engineering is Elementary*
Northwest	*Sibley*	*ISU Extension & Outreach- Osceola County*	*Engineering is Elementary*
Northwest	*Sibley*	*Sibley-Ocheyedan Elementary School*	*Engineering is Elementary*
Northwest	*Sibley*	*Sibley-Ocheyedan Elementary School*	*Engineering is Elementary*
Northwest	*Sioux City*	*Iowa State University Extension-Woodbury County*	*Engineering is Elementary*
Northwest	*Sioux City*	*Iowa State University Extension-Woodbury County*	*Engineering is Elementary*
Northwest	*Sioux City*	*Iowa State University Extension-Woodbury County*	*Engineering is Elementary*
Northwest	*Sioux City*	*Liberty Elementary School*	*Engineering is Elementary*
Northwest	*Sioux City*	*Liberty Elementary School*	*Engineering is Elementary*
Northwest	*Sioux City*	*Liberty Elementary School*	*Engineering is Elementary*
Northwest	*Sioux City*	*Liberty Elementary School*	*Engineering is Elementary*
Northwest	*Sioux City*	*Liberty Elementary School*	*Engineering is Elementary*
Northwest	*Sioux City*	*Northwest AEA*	*Engineering is Elementary*
Northwest	*Spencer*	*Spencer Community Schools*	*Engineering is Elementary*

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
Northwest	Carroll	Kuemper Catholic High School	HyperStream
Northwest	George	George-Little Rock High School	HyperStream
Northwest	Graettinger	Graettinger-Terril MS/HS TAG	HyperStream
Northwest	Holstein	Galva-Holstein CSD	HyperStream
Northwest	Hull	Boyden-Hull Gifted and Talented	HyperStream
Northwest	Lake Park	Harris-Lake Park Community School District	HyperStream
Northwest	Lawton	Lawton-Bronson Community School	HyperStream
Northwest	Milford	Okoboji High School	HyperStream
Northwest	Newell	Newell-Fonda Talented and Gifted	HyperStream
Northwest	Onawa	West Monona High School	HyperStream
Northwest	Onawa	West Monona High School	HyperStream
Northwest	Orange City	Sioux County 4-H	HyperStream
Northwest	Sioux City	West High	HyperStream
Northwest	West Bend	West Bend-Mallard Community School District	HyperStream
Northwest	Anthon	Maple Valley-Anthon Oto Community School District	PLTW Gateway to Technology
Northwest	Arnolds Park	Okoboji Middle School	PLTW Gateway to Technology
Northwest	Aurelia	Alta-Aurelia Middle School	PLTW Gateway to Technology
Northwest	Humbolt	Humboldt Middle School	PLTW Gateway to Technology
Northwest	Lawton	Lawton-Bronson Community School	PLTW Gateway to Technology
Northwest	Little Rock	George-Little Rock Community School District	PLTW Gateway to Technology
Northwest	Spencer	Spencer Community Schools	PLTW Gateway to Technology
South Central	Ames	Youth and Shelter Services Kids Club	A World in Motion
South Central	Baxter	Baxter Community School District	A World in Motion
South Central	Bondurant	Bondurant	A World in Motion
South Central	Carlisle	Carlisle Extended Learning Program	A World in Motion
South Central	Carlisle	Carlisle Middle School	A World in Motion
South Central	Des Moines	Des Moines Capitol View Elementary	A World in Motion
South Central	Des Moines	Des Moines Capitol View Elementary	A World in Motion
South Central	Des Moines	Saint Theresa School	A World in Motion
South Central	Des Moines	Saint Theresa School	A World in Motion
South Central	Des Moines	Stowe Elementary	A World in Motion
South Central	Des Moines	Stowe Elementary	A World in Motion
South Central	Des Moines	Stowe Elementary	A World in Motion
South Central	Des Moines	Stowe Elementary	A World in Motion
South Central	Des Moines	Stowe Elementary	A World in Motion

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
South Central	*Des Moines*	*Stowe Elementary*	*A World in Motion*
South Central	*Des Moines*	*Stowe Elementary*	*A World in Motion*
South Central	*Des Moines*	*Stowe Elementary*	*A World in Motion*
South Central	*DeSoto*	*DeSoto Intermediate*	*A World in Motion*
South Central	*Granger*	*Woodward-Granger School District*	*A World in Motion*
South Central	*Grinnell*	*Poweshiek County Extension*	*A World in Motion*
South Central	*Monroe*	*Monroe Elementary School*	*A World in Motion*
South Central	*Monroe*	*Monroe Elementary School*	*A World in Motion*
South Central	*Norwalk*	*Oviatt Elementary School*	*A World in Motion*
South Central	*Prairie City*	*Prairie City Elementary*	*A World in Motion*
South Central	*Urbandale*	*Urbandale Community Education*	*A World in Motion*
South Central	*West Des Moines*	*Phenix Elementary*	*A World in Motion*
South Central	*West Des Moines*	*Phenix Tiger Cubs Preschool*	*A World in Motion*
South Central	*Windsor Heights*	*Cowles Montessori School*	*A World in Motion*
South Central	*Windsor Heights*	*Cowles Montessori School*	*A World in Motion*
South Central	*Windsor Heights*	*Cowles Montessori School*	*A World in Motion*
South Central	*Windsor Heights*	*Cowles Montessori School*	*A World in Motion*
South Central	*Windsor Heights*	*Cowles Montessori School*	*A World in Motion*
South Central	*Windsor Heights*	*Cowles Montessori School*	*A World in Motion*
South Central	*Winterset*	*ISU Extension & Outreach - Madison County*	*A World in Motion*
South Central	*Winterset*	*Winterset Junior High and High School*	*A World in Motion*
South Central	*Woodward*	*Woodward Granger Junior High School*	*A World in Motion*
South Central	*Ankeny*	*Kirkendall Public Library*	*Camp in a Can*
South Central	*Blooomfield*	*Iowa State University- Davis County Extension & Outreach*	*Camp in a Can*
South Central	*Corydon*	*Iowa State University Wayne County Extension & Outreach*	*Camp in a Can*
South Central	*Montezuma*	*Poweshiek County Extension*	*Camp in a Can*
South Central	*Osceola*	*Iowa State University Extension and Outreach-Clarke County*	*Camp in a Can*
South Central	*Oskaloosa*	*ISU Extension & Outreach - Mahaska County*	*Camp in a Can*
South Central	*Urbandale*	*Urbandale Community Education*	*Camp in a Can*
South Central	*Baxter*	*Baxter Community School District*	*Carolina STEM Curriculum*
South Central	*Blakesburg*	*Blakesburg Elementary*	*Carolina STEM Curriculum*

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
South Central	Des Moines	Merideth Middle School	Carolina STEM Curriculum
South Central	Des Moines	Saint Theresa School	Carolina STEM Curriculum
South Central	Des Moines	Saint Theresa School	Carolina STEM Curriculum
South Central	Des Moines	Saint Theresa School	Carolina STEM Curriculum
South Central	Des Moines	Saint Theresa School	Carolina STEM Curriculum
South Central	Des Moines	Scavo High School	Carolina STEM Curriculum
South Central	Eddyville	Eddyville Elementary	Carolina STEM Curriculum
South Central	Eddyville	Eddyville Elementary	Carolina STEM Curriculum
South Central	Fremont	Fremont Elementary	Carolina STEM Curriculum
South Central	Huxley	Ballard Middle School	Carolina STEM Curriculum
South Central	Huxley	Ballard Middle School	Carolina STEM Curriculum
South Central	Huxley	Ballard Middle School	Carolina STEM Curriculum
South Central	Johnston	Johnston Community Schools Preschool	Carolina STEM Curriculum
South Central	Melcher	Melcher-Dallas JH/HS	Carolina STEM Curriculum
South Central	Melcher	Melcher-Dallas JH/HS	Carolina STEM Curriculum
South Central	Monroe	Monroe Elementary School	Carolina STEM Curriculum
South Central	Norwalk	Oviatt Elementary School	Carolina STEM Curriculum
South Central	Prairie City	Prairie City Elementary	Carolina STEM Curriculum
South Central	Prairie City	Prairie City Elementary	Carolina STEM Curriculum
South Central	Prairie City	Prairie City Elementary	Carolina STEM Curriculum
South Central	Prairie City	Prairie City Elementary	Carolina STEM Curriculum
South Central	Prairie City	Prairie City Elementary	Carolina STEM Curriculum
South Central	Windsor Heights	Cowles Montessori School	Carolina STEM Curriculum

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
South Central	*Windsor Heights*	*Cowles Montessori School*	*Carolina STEM Curriculum*
South Central	*Windsor Heights*	*Cowles Montessori School*	*Carolina STEM Curriculum*
South Central	*Windsor Heights*	*Cowles Montessori School*	*Carolina STEM Curriculum*
South Central	*Windsor Heights*	*Cowles Montessori School*	*Carolina STEM Curriculum*
South Central	*Windsor Heights*	*Cowles Montessori School*	*Carolina STEM Curriculum*
South Central	*Winterset*	*Winterset Junior High School*	*Carolina STEM Curriculum*
South Central	*Winterset*	*Winterset Junior High School*	*Carolina STEM Curriculum*
South Central	*Alleman*	*North Polk Ag Department*	*Curriculum for Agriscience Education (CASE)*
South Central	*Baxter*	*Baxter High School*	*Curriculum for Agriscience Education (CASE)*
South Central	*Corydon*	*Wayne Agriculture Education Department*	*Curriculum for Agriscience Education (CASE)*
South Central	*Des Moines*	*Central Campus High School*	*Curriculum for Agriscience Education (CASE)*
South Central	*Le Grand*	*East Marshall High School*	*Curriculum for Agriscience Education (CASE)*
South Central	*Maxwell*	*Collins-Maxwell Ag Department*	*Curriculum for Agriscience Education (CASE)*
South Central	*Osceola*	*Clarke Community School*	*Curriculum for Agriscience Education (CASE)*
South Central	*Pleasant Hill*	*Southeast Warren Jr-Sr High School*	*Curriculum for Agriscience Education (CASE)*
South Central	*Seymour*	*Seymour School*	*Curriculum for Agriscience Education (CASE)*
South Central	*Truro*	*Interstate 35 Agriculture Education*	*Curriculum for Agriscience Education (CASE)*
South Central	*Woodward*	*Woodward-Granger High School*	*Curriculum for Agriscience Education (CASE)*

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
South Central	Albia	Albia Community School District	Defined STEM
South Central	Alleman	North Polk Middle School	Defined STEM
South Central	Des Moines	Des Moines Public Schools	Defined STEM
South Central	Des Moines	Hoover High School	Defined STEM
South Central	Grinnell	Grinnell-Newburg Community School District	Defined STEM
South Central	Melcher	Melcher-Dallas JH/HS	Defined STEM
South Central	Woodward	Woodward-Granger High School	Defined STEM
South Central	Adel	ISU Extension and Outreach- Dallas County	Engineering is Elementary
South Central	Albia	Iowa State University- Monroe County Extension & Outreach	Engineering is Elementary
South Central	Bloomfield	Iowa State University- Davis County Extension & Outreach	Engineering is Elementary
South Central	Bloomfield	Iowa State University Extension-Wapello County	Engineering is Elementary
South Central	Brooklyn	Iowa State University Extension-Poweshiek County	Engineering is Elementary
South Central	Centerville	Iowa State University Extension	Engineering is Elementary
South Central	Chariton	ISU Extension and Outreach	Engineering is Elementary
South Central	Collins	Collins-Maxwell Elementary	Engineering is Elementary
South Central	Collins	Collins-Maxwell Elementary	Engineering is Elementary
South Central	Corydon	Iowa State University- Wayne County Extension & Outreach	Engineering is Elementary
South Central	Des Moines	Greenwood Elementary School	Engineering is Elementary
South Central	Des Moines	Greenwood Elementary School	Engineering is Elementary
South Central	Des Moines	Greenwood Elementary School	Engineering is Elementary
South Central	Des Moines	Greenwood Elementary School	Engineering is Elementary
South Central	Des Moines	Greenwood Elementary School	Engineering is Elementary
South Central	Des Moines	Greenwood Elementary School	Engineering is Elementary
South Central	Des Moines	Greenwood Elementary School	Engineering is Elementary
South Central	Des Moines	Greenwood Elementary School	Engineering is Elementary
South Central	Des Moines	Greenwood Elementary School	Engineering is Elementary

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
South Central	*Des Moines*	*Greenwood Elementary School*	*Engineering is Elementary*
South Central	*Des Moines*	*Greenwood Elementary School*	*Engineering is Elementary*
South Central	*Des Moines*	*Greenwood Elementary School*	*Engineering is Elementary*
South Central	*Des Moines*	*Greenwood Elementary School*	*Engineering is Elementary*
South Central	*Des Moines*	*Greenwood Elementary School*	*Engineering is Elementary*
South Central	*Des Moines*	*Greenwood Elementary School*	*Engineering is Elementary*
South Central	*Des Moines*	*Iowa Education Brain Trust*	*Engineering is Elementary*
South Central	*Granger*	*Woodward-Granger Community School District*	*Engineering is Elementary*
South Central	*Granger*	*Woodward-Granger Community School District*	*Engineering is Elementary*
South Central	*Granger*	*Woodward-Granger Community School District*	*Engineering is Elementary*
South Central	*Granger*	*Woodward-Granger Community School District*	*Engineering is Elementary*
South Central	*Knoxville*	*Marion County 4-H*	*Engineering is Elementary*
South Central	*Monroe*	*Monroe Elementary School*	*Engineering is Elementary*
South Central	*Monroe*	*Monroe Elementary School*	*Engineering is Elementary*
South Central	*Newton*	*Iowa State Extension and Outreach- Jasper County*	*Engineering is Elementary*
South Central	*Pella*	*Jefferson Intermediate*	*Engineering is Elementary*
South Central	*Pella*	*Jefferson Intermediate*	*Engineering is Elementary*
South Central	*Pella*	*Jefferson Intermediate*	*Engineering is Elementary*
South Central	*Pella*	*Madison Elementary*	*Engineering is Elementary*
South Central	*Pella*	*Madison Elementary*	*Engineering is Elementary*
South Central	*Pella*	*Madison Elementary*	*Engineering is Elementary*
South Central	*Prairie City*	*Prairie City Elementary*	*Engineering is Elementary*
South Central	*Prairie City*	*Prairie City Elementary*	*Engineering is Elementary*

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
South Central	Urbandale	Urbandale Community Education	Engineering is Elementary
South Central	West Des Moines	Phenix Early Childhood Center	Engineering is Elementary
South Central	West Des Moines	Phenix Early Childhood Center	Engineering is Elementary
South Central	Windsor Heights	Cowles Montessori School	Engineering is Elementary
South Central	Windsor Heights	Cowles Montessori School	Engineering is Elementary
South Central	Windsor Heights	Cowles Montessori School	Engineering is Elementary
South Central	Windsor Heights	Cowles Montessori School	Engineering is Elementary
South Central	Windsor Heights	Cowles Montessori School	Engineering is Elementary
South Central	Windsor Heights	Cowles Montessori School	Engineering is Elementary
South Central	Ankeny	Ankeny Centennial High School	HyperStream
South Central	Carlisle	Carlisle Schools	HyperStream
South Central	Centerville	Centerville High School FBLA	HyperStream
South Central	Des Moines	Callanan Middle School	HyperStream
South Central	Des Moines	Hoyt Middle School	HyperStream
South Central	Grimes	Dallas Center - Grimes Community School District	HyperStream
South Central	Grimes	Dallas Center - Grimes Meadows Middle School	HyperStream
South Central	Maxwell	Collins-Maxwell Community School District	HyperStream
South Central	Oskaloosa	Oskaloosa Robotics Club	HyperStream
South Central	Ottumwa	Ottumwa High School	HyperStream
South Central	Urbandale	Urbandale High School	HyperStream
South Central	Waukee	Waukee High School	HyperStream
South Central	West Des Moines	General Dynamics Information Technology	HyperStream
South Central	West Des Moines	Stilwell Junior High	HyperStream
South Central	Winterset	Winterset Junior High and High School	HyperStream
South Central	Chariton	Chariton Middle School	PLTW Gateway to Technology
South Central	Des Moines	Saint Theresa School	PLTW Gateway to Technology
South Central	Grimes	Dallas Center-Grimes Community School District	PLTW Gateway to Technology
South Central	Melcher	Melcher-Dallas JH/HS	PLTW Gateway to Technology

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
Southeast	Bettendorf	Girl Scouts of Eastern Iowa and Western Illinois	A World in Motion
Southeast	Bettendorf	Pleasant View Elementary- Extended Learning Program	A World in Motion
Southeast	Camanche	Camanche School District	A World in Motion
Southeast	Cedar Rapids	Cedar Rapids Science Center	A World in Motion
Southeast	Cedar Rapids	Girl Scouts of Eastern Iowa and Western Illinois	A World in Motion
Southeast	Cedar Rapids	Prairie Creek Intermediate School	A World in Motion
Southeast	Durant	Durant Elementary School	A World in Motion
Southeast	Durant	Durant Elementary School	A World in Motion
Southeast	Durant	Durant Middle School	A World in Motion
Southeast	Durant	Durant Middle School	A World in Motion
Southeast	Eldridge	Ed White Elementary	A World in Motion
Southeast	Iowa City	Iowa City Home School Assistance Program	A World in Motion
Southeast	LeClaire	Cody Elementary	A World in Motion
Southeast	Lone Tree	Lone Tree Community School	A World in Motion
Southeast	Marion	Vernon Middle School Science/STEM Club	A World in Motion
Southeast	West Burlington	Girl Scouts of Eastern Iowa and Western Illinois	A World in Motion
Southeast	Bettendorf	Bettendorf Community School District	Camp in a Can
Southeast	Cedar Rapids	Rockwell Child Development Center	Camp in a Can
Southeast	Coralville	The Iowa Children's Museum	Camp in a Can
Southeast	DeWitt	ISU Extension and Outreach-Clinton County	Camp in a Can
Southeast	Fairfield	Iowa State University- Jefferson County Extension & Outreach	Camp in a Can
Southeast	Sigourney	Iowa State University Extension and Outreach - Keokuk County 4-H	Camp in a Can
Southeast	Vinton	Iowa State University Extension	Camp in a Can
Southeast	Atkins	Benton Community Schools	Carolina STEM Curriculum
Southeast	Burlington	Corse Elementary School	Carolina STEM Curriculum
Southeast	Cedar Rapids	ISU Extension - Linn County	Carolina STEM Curriculum
Southeast	Cedar Rapids	LaSalle Middle School	Carolina STEM Curriculum
Southeast	Durant	Durant Elementary School	Carolina STEM Curriculum
Southeast	Durant	Durant Elementary School	Carolina STEM Curriculum
Southeast	Durant	Durant Middle School	Carolina STEM Curriculum
Southeast	Durant	Durant Middle School	Carolina STEM Curriculum
Southeast	Fort Madison	Richardson Elementary	Carolina STEM

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
			Curriculum
Southeast	Iowa City	Regina Elementary School	Carolina STEM Curriculum
Southeast	Iowa City	Regina Elementary School	Carolina STEM Curriculum
Southeast	Iowa City	Regina Elementary School	Carolina STEM Curriculum
Southeast	Iowa City	Regina Elementary School	Carolina STEM Curriculum
Southeast	Iowa City	Regina Elementary School	Carolina STEM Curriculum
Southeast	Iowa City	Regina Elementary School	Carolina STEM Curriculum
Southeast	Iowa City	Regina Elementary School	Carolina STEM Curriculum
Southeast	Iowa City	Regina Elementary School	Carolina STEM Curriculum
Southeast	Iowa City	Regina Elementary School	Carolina STEM Curriculum
Southeast	Iowa City	Regina Elementary School	Carolina STEM Curriculum
Southeast	Iowa City	Regina Elementary School	Carolina STEM Curriculum
Southeast	Iowa City	Regina Elementary School	Carolina STEM Curriculum
Southeast	Iowa City	Regina Elementary School	Carolina STEM Curriculum
Southeast	Marion	St. Joseph School	Carolina STEM Curriculum
Southeast	Mediapolis	Mediapolis Middle School	Carolina STEM Curriculum
Southeast	Mediapolis	Mediapolis Middle School	Carolina STEM Curriculum
Southeast	Mt. Pleasant	Van Allen Elementary	Carolina STEM Curriculum
Southeast	Thornburt	Tri-County Community School District	Carolina STEM Curriculum
Southeast	Wapello	Wapello Community Schools	Carolina STEM Curriculum
Southeast	Wilton	Wilton Community Schools	Carolina STEM Curriculum
Southeast	Wilton	Wilton Community Schools	Carolina STEM Curriculum
Southeast	Wilton	Wilton Community Schools	Carolina STEM Curriculum
Southeast	Wilton	Wilton Community Schools	Carolina STEM

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
			Curriculum
Southeast	Wilton	Wilton Elementary School	Carolina STEM Curriculum
Southeast	Wilton	Wilton Elementary School	Carolina STEM Curriculum
Southeast	Belle Plaine	Belle Plaine Ag Ed Dept	Curriculum for Agriscience Education (CASE)
Southeast	Eldon	Cardinal Agricultural Education Department	Curriculum for Agriscience Education (CASE)
Southeast	Eldon	Cardinal Agricultural Education Department	Curriculum for Agriscience Education (CASE)
Southeast	Eldridge	North Scott Community School District	Curriculum for Agriscience Education (CASE)
Southeast	Fort Madison	Holy Trinity Catholic High School	Curriculum for Agriscience Education (CASE)
Southeast	Marion	Linn-Mar Agricultural Science Education Department	Curriculum for Agriscience Education (CASE)
Southeast	Packwood	Pekin Community School District	Curriculum for Agriscience Education (CASE)
Southeast	Van Horne	Benton Community Agriculture Education Department	Curriculum for Agriscience Education (CASE)
Southeast	Washington	Washington Agricultural Education	Curriculum for Agriscience Education (CASE)
Southeast	West Branch	West Branch High School	Curriculum for Agriscience Education (CASE)
Southeast	Bettendorf	Bettendorf Community School District	Engineering is Elementary
Southeast	Cedar Rapids	Space Flyers	Engineering is Elementary
Southeast	Douds	Van Buren Community School District	Engineering is Elementary
Southeast	Iowa City	Lemme and Grant Wood Elementary Schools	Engineering is Elementary
Southeast	Iowa City	Lincoln Elementary School	Engineering is Elementary
Southeast	Morning Sun	Morning Sun Community School	Engineering is Elementary

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
Southeast	*Morning Sun*	*Morning Sun Elementary*	*Engineering is Elementary*
Southeast	*Morning Sun*	*Morning Sun Elementary*	*Engineering is Elementary*
Southeast	*Muscatine*	*ISU Extension and Outreach - Muscatine County*	*Engineering is Elementary*
Southeast	*Shellsburg*	*Shellsburg 5th Grade Science Club*	*Engineering is Elementary*
Southeast	*Sigourney*	*Iowa State University Extension and Outreach - Keokuk County 4-H*	*Engineering is Elementary*
Southeast	*Sigourney*	*Sigourney Elementary*	*Engineering is Elementary*
Southeast	*Tipton*	*ISU Extension and Outreach - Cedar County*	*Engineering is Elementary*
Southeast	*Washington*	*Washington County Extension/4-H*	*Engineering is Elementary*
Southeast	*Wilton*	*Wilton Elementary School*	*Engineering is Elementary*
Southeast	*Wilton*	*Wilton Elementary School*	*Engineering is Elementary*
Southeast	*Wilton*	*Wilton Elementary School*	*Engineering is Elementary*
Southeast	*Cedar Rapids*	*Cedar Rapids Public Library*	*Hyperstream*
Southeast	*Central City*	*Central City Middle School*	*Hyperstream*
Southeast	*Farmington*	*Harmony Jr/Sr High School*	*Hyperstream*
Southeast	*Burlington*	*Burlington Community School District*	*PLTW Gateway to Technology*
Southeast	*Davenport*	*Davenport Community School District*	*PLTW Gateway to Technology*
Southeast	*Davenport*	*Davenport Community School District*	*PLTW Gateway to Technology*
Southeast	*Donnellson*	*Central Lee Middle School*	*PLTW Gateway to Technology*
Southeast	*Fairfield*	*Fairfield Middle School*	*PLTW Gateway to Technology*
Southeast	*Marion*	*Linn-Mar Community School District*	*PLTW Gateway to Technology*
Southeast	*Marion*	*Vernon Middle School*	*PLTW Gateway to Technology*
Southeast	*Mediapolis*	*Mediapolis Community Middle School*	*PLTW Gateway to Technology*
Southeast	*Mount Pleasant*	*Mount Pleasant Middle School*	*PLTW Gateway to Technology*
Southeast	*Sigourney*	*Sigourney Jr-Sr High School*	*PLTW Gateway to Technology*
Southeast	*Wellman*	*Mid-Prairie Middle School*	*PLTW Gateway to*

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
			Technology
Southeast	West Branch	West Branch Community Schools	PLTW Gateway to Technology
Southeast	West Burlington	West Burlington Arnold Jr/Sr High School	PLTW Gateway to Technology
Southwest	Atlantic	Cass County Extension	A World in Motion
Southwest	Atlantic	Cass County Extension	A World in Motion
Southwest	Clarinda	Clarinda Middle School	A World in Motion
Southwest	Clarinda	Garfield Elementary - 3rd grade	A World in Motion
Southwest	Clarinda	Garfield Elementary - TAG	A World in Motion
Southwest	Corning	Corning Extended Learning Program	A World in Motion
Southwest	Greenfield	Nodaway Valley Community School District	A World in Motion
Southwest	Harlan	Harlan Comm. School	A World in Motion
Southwest	Harlan	Harlan Community Primary	A World in Motion
Southwest	Harlan	Harlan Community Primary	A World in Motion
Southwest	Harlan	Harlan Community Schools	A World in Motion
Southwest	Harlan	Harlan Intermediate School	A World in Motion
Southwest	Harlan	Shelby County ISU Extension & Outreach	A World in Motion
Southwest	Harlan	Shelby County ISU Extension & Outreach	A World in Motion
Southwest	Harlan	Shelby County ISU Extension & Outreach	A World in Motion
Southwest	Harlan	Shelby County ISU Extension & Outreach	A World in Motion
Southwest	Harlan	Special Education	A World in Motion
Southwest	Lenox	Lenox Talented and Gifted	A World in Motion
Southwest	Manilla	IKM-Manning Middle School	A World in Motion
Southwest	Panora	Panorama Elementary School	A World in Motion
Southwest	Panora	Panther Pals Preschool	A World in Motion
Southwest	Underwood	Underwood Schools	A World in Motion
Southwest	Underwood	Underwood Schools	A World in Motion
Southwest	Underwood	Underwood Schools	A World in Motion
Southwest	Villisca	Enarson Elementary	A World in Motion
Southwest	Villisca	Enarson Elementary	A World in Motion
Southwest	Atlantic	Cass County Extension	Camp in a Can
Southwest	Audubon	Iowa State University Extension and Outreach-Audubon County	Camp in a Can
Southwest	Creston	Union County Extension & Outreach	Camp in a Can
Southwest	Harlan	Shelby County Extension & Outreach	Camp in a Can
Southwest	Malvern	ISU Extension & Outreach- Mills County 4-H Afterschool	Camp in a Can
Southwest	Oakland	East Pottawattamie County Agricultural Extension District	Camp in a Can
Southwest	Villisca	Villisca Before and After School Program	Camp in a Can
Southwest	Afton	East Union	Carolina STEM

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
			Curriculum
Southwest	Afton	East Union Community School	Carolina STEM Curriculum
Southwest	Afton	East Union Community School District	Carolina STEM Curriculum
Southwest	Afton	East Union Community Schools	Carolina STEM Curriculum
Southwest	Afton	East Union Community Schools	Carolina STEM Curriculum
Southwest	Afton	East Union Elementary	Carolina STEM Curriculum
Southwest	Afton	East Union Elementary	Carolina STEM Curriculum
Southwest	Afton	East Union Elementary	Carolina STEM Curriculum
Southwest	Afton	East Union Elementary	Carolina STEM Curriculum
Southwest	Afton	East Union Elementary	Carolina STEM Curriculum
Southwest	Afton	East Union Elementary	Carolina STEM Curriculum
Southwest	Afton	East Union Elementary	Carolina STEM Curriculum
Southwest	Afton	East Union School	Carolina STEM Curriculum
Southwest	Afton	East Union Schools	Carolina STEM Curriculum
Southwest	Afton	East Union Schools	Carolina STEM Curriculum
Southwest	Atlantic	Cass County Extension	Carolina STEM Curriculum
Southwest	Audubon	Audubon Community School District	Carolina STEM Curriculum
Southwest	Council Bluffs	Kreft Primary School	Carolina STEM Curriculum
Southwest	Council Bluffs	Kreft Primary School	Carolina STEM Curriculum
Southwest	Council Bluffs	Kreft Primary School	Carolina STEM Curriculum
Southwest	Council Bluffs	Kreft Primary School	Carolina STEM Curriculum
Southwest	Council Bluffs	Kreft Primary School	Carolina STEM Curriculum
Southwest	Council Bluffs	Lewis Central Middle School	Carolina STEM Curriculum
Southwest	Council Bluffs	Lewis Central Middle School	Carolina STEM

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
			Curriculum
Southwest	Council Bluffs	Lewis Central Middle School	Carolina STEM Curriculum
Southwest	Council Bluffs	Titan Hill Intermediate School	Carolina STEM Curriculum
Southwest	Council Bluffs	Titan Hill Intermediate School	Carolina STEM Curriculum
Southwest	Council Bluffs	Titan Hill Intermediate School	Carolina STEM Curriculum
Southwest	Council Bluffs	Titan Hill Intermediate School	Carolina STEM Curriculum
Southwest	Creston	East Union Elementary- Third Grade	Carolina STEM Curriculum
Southwest	Greenfield	Nodaway Valley Community School District	Carolina STEM Curriculum
Southwest	Harlan	Harlan Community Primary	Carolina STEM Curriculum
Southwest	Harlan	Harlan Community Elementary	Carolina STEM Curriculum
Southwest	Harlan	Harlan Community Elementary	Carolina STEM Curriculum
Southwest	Harlan	Harlan Intermediate School	Carolina STEM Curriculum
Southwest	Harlan	Harlan Intermediate School	Carolina STEM Curriculum
Southwest	Harlan	Harlan Community Primary	Carolina STEM Curriculum
Southwest	Harlan	Harlan Community Primary	Carolina STEM Curriculum
Southwest	Harlan	Harlan Community Schools	Carolina STEM Curriculum
Southwest	Harlan	Harlan Community Schools	Carolina STEM Curriculum
Southwest	Harlan	Harlan Intermediate School	Carolina STEM Curriculum
Southwest	Harlan	Harlan Intermediate School	Carolina STEM Curriculum
Southwest	Harlan	Harlan Community Primary	Carolina STEM Curriculum
Southwest	Harlan	Harlan Community Primary	Carolina STEM Curriculum
Southwest	Harlan	ISU Extension & Outreach	Carolina STEM Curriculum
Southwest	Iowa	Harlan Community Primary	Carolina STEM Curriculum
Southwest	Kirkman	Harlan Community Primary	Carolina STEM

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
			Curriculum
Southwest	Onawa	West Monona Middle School	Carolina STEM Curriculum
Southwest	Redfield	West Central Valley Middle School	Carolina STEM Curriculum
Southwest	Redfield	West Central Valley Middle School	Carolina STEM Curriculum
Southwest	Villisca	Enarson Elementary	Carolina STEM Curriculum
Southwest	Villisca	Enarson Elementary	Carolina STEM Curriculum
Southwest	Villisca	Enarson Elementary	Carolina STEM Curriculum
Southwest	Villisca	Enarson Elementary	Carolina STEM Curriculum
Southwest	Villisca	Enarson Elementary	Carolina STEM Curriculum
Southwest	Villisca	Enarson Elementary School	Carolina STEM Curriculum
Southwest	Afton	East Union Agriculture Education Department	Curriculum for Agriscience Education (CASE)
Southwest	Audubon	Audubon Community School District	Curriculum for Agriscience Education (CASE)
Southwest	Clarinda	Clarinda Agriculture Education	Curriculum for Agriscience Education (CASE)
Southwest	Creston	Creston Agriculture Education	Curriculum for Agriscience Education (CASE)
Southwest	Earlham	Earlham Agriculture Education Dept.	Curriculum for Agriscience Education (CASE)
Southwest	Elk Horn	Exira-EHK FFA	Curriculum for Agriscience Education (CASE)
Southwest	Glenwood	Glenwood High School	Curriculum for Agriscience Education (CASE)
Southwest	Manning	IKM-Manning Agricultural Education and Science Department	Curriculum for Agriscience Education (CASE)
Southwest	Mondamin	West Harrison Agriculture Education Department	Curriculum for Agriscience Education (CASE)
Southwest	Murray	Murray Agriculture Education Program	Curriculum for

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
			Agriscience Education (CASE)
Southwest	Murray	Murray Agriculture Education Program	Curriculum for Agriscience Education (CASE)
Southwest	Red Oak	Red Oak High School	Curriculum for Agriscience Education (CASE)
Southwest	Stuart	West Central Valley High School	Curriculum for Agriscience Education (CASE)
Southwest	Afton	East Union School	Defined STEM
Southwest	Atlantic	Atlantic Community Schools	Defined STEM
Southwest	Coon Rapids	Coon Rapids-Bayard Community School District	Defined STEM
Southwest	Council Bluffs	Lewis Central Community Schools	Defined STEM
Southwest	Greenfield	Nodaway Valley Community School District	Defined STEM
Southwest	Greenfield	Nodaway Valley Community School District	Defined STEM
Southwest	Neola	Tri-Center High School	Defined STEM
Southwest	Panora	Panorama	Defined STEM
Southwest	Afton	East Union Community Schools	Engineering is Elementary
Southwest	Afton	East Union Elementary	Engineering is Elementary
Southwest	Afton	East Union Schools	Engineering is Elementary
Southwest	Clarinda	Garfield Elementary - 3rd grade	Engineering is Elementary
Southwest	Clarinda	Garfield Elementary - TAG	Engineering is Elementary
Southwest	Council Bluffs	Kreft Primary School	Engineering is Elementary
Southwest	Council Bluffs	Titan Hill Intermediate School	Engineering is Elementary
Southwest	Council Bluffs	Titan Hill Intermediate School	Engineering is Elementary
Southwest	Council Bluffs	Titan Hill Intermediate School	Engineering is Elementary
Southwest	Council Bluffs	Titan Hill Intermediate School	Engineering is Elementary
Southwest	Creston	Union County Extension & Outreach	Engineering is Elementary
Southwest	Dexter	Dexter Elementary	Engineering is Elementary
Southwest	Greenfield	Nodaway Valley Elementary	Engineering is Elementary
Southwest	Harlan	Shelby County Extension & Outreach	Engineering is

STEM Region	City	Applicant Organization	2013-14 STEM Scale-Up Program
			Elementary
Southwest	*Orient*	*Orient-Macksburg School*	*Engineering is Elementary*
Southwest	*Prescott*	*Prescott Elementary*	*Engineering is Elementary*
Southwest	*Underwood*	*Underwood Schools*	*Engineering is Elementary*
Southwest	*Underwood*	*Underwood Schools*	*Engineering is Elementary*
Southwest	*Underwood*	*Underwood Schools*	*Engineering is Elementary*
Southwest	*Underwood*	*Underwood Schools*	*Engineering is Elementary*
Southwest	*Underwood*	*Underwood Schools*	*Engineering is Elementary*
Southwest	*Corning*	*Corning HS Robotics Club*	*HyperStream*
Southwest	*Council Bluffs*	*Council Bluffs Public Library*	*HyperStream*
Southwest	*Council Bluffs*	*Kirn Middle School*	*HyperStream*
Southwest	*Council Bluffs*	*Thomas Jefferson High School*	*HyperStream*
Southwest	*Logan*	*Harrison County Extension 4-H*	*HyperStream*
Southwest	*Neola*	*Tri-Center High School*	*HyperStream*
Southwest	*Red Oak*	*Red Oak High School*	*HyperStream*
Southwest	*Underwood*	*Underwood Schools*	*HyperStream*
Southwest	*Diagonal*	*Diagona Jr.Sr. High School*	*PLTW Gateway to Technology*
Southwest	*Harlan*	*Harlan Community Schools*	*PLTW Gateway to Technology*
Southwest	*Harlan*	*Harlan Community Schools*	*PLTW Gateway to Technology*
Southwest	*Massena*	*CAM Community Middle School*	*PLTW Gateway to Technology*
Southwest	*Treynor*	*Treynor Community School District*	*PLTW Gateway to Technology*
Southwest	*Villisca*	*Villisca Community School District*	*PLTW Gateway to Technology*

Appendix M: Regional Scale-Up Program_Courses taught by Participating teachers

Prepared by Research Institute for Studies in Education (RISE), Iowa State University

- 1st grade teacher - all subjects
- 2nd Grade General Ed. (2 responses)
- 2nd Grade general education teacher
- 3 sections of Science, Reading, Written Language
- 3rd and 4th grade science
- 3rd grade-self contained
- 4-H (2 responses)
- 4-H and Youth Development
- 4th Grade General Educations
- 4th grade, all subject areas
- 4th reading and science
- 4th technology, 5th technology, 7th GTT DM, 8th GTT AR
- 5th grade language arts, math, and science
- 5th Grade Reading and Science
- 5th grade Self Contained: Reading, Language Arts, Math, Writing, Science and Social Studies
- 5th Grade, all subjects.
- 6th and 7th grade science and GTT
- 6th/8th Life Skills (Guidance)
- 7th and 8th Grade Science (2 responses)
- 7th Grade Life Science
- 7th Grade Life Science, 8th grade Physical Science
- 7th Grade- Science, Math, Social Studies / 8th Grade-Science, Social Studies / Junior High- Reading Lab, Study Hall
- 8th Earth Science
- 8th grade Physical Science
- 8th grade science and advanced science
- 8th Science
- 9-12 Agricultural Education, 7-8 exploratory
- 9-12 principal
- Accounting I & II, Computer Hardware, Networking Basics, Web Graphics, Web Design, and Technology Exploration
- Accounting, Careers, Business Law, Economics, Marketing, 8th technology, 7th technology, 6th technology
- Administration
- After School Program (2 responses)
- After-school and school enrichment programs
- Ag Education
- Ag Science and Industrial Tech
- Agricultural Education (6 responses)
- Agricultural Education - CASE Agriculture, Food and Natural Resources, CASE - Plant, CASE Animal, CASE Natural Resources and Ecology, Aquaculture Science, and CASE Food Science (2014-2015 school year).
- Agricultural Education and FFA Advisor
- Agricultural Science (3 responses)
- Agriculture (6 responses)
- Agriculture - Animal Science, Plant Science, Ag Business, Intro to Agriculture, Horticulture
- Agriculture (Animal Science, Horticulture, Ag Marketing; 7th Exploratory, 8th Exploratory, Natural Resources, Ag Issues)
- Agriculture / Environmental Science
- Agriculture and Biology (2 responses)
- Agriculture- CASE AFNR, CASE Plant Science, Animal Production, Small Animal Care, Agricultural Mechanics, Welding, Natural Resources, Agriculture Leadership, Agriculture Business, Horticulture, and 7th and 8th Grade Agriculture Exploratory
- Agriculture Education (8 responses)
- Agriculture Education / / This is for the 2011-2012 STEM CASE Grant - I could not get CASE certified until June 2013 and it was not implemented in the school as a year long class until January 2014 where CASE Plant part 1 will be implemented with CASE Plant Part 2 in the fall of 2014
- Agriculture Education and Family Consumer Science
- Agriculture Including: CASE Agriculture, Food, and Natural Resources, Ag Business, Welding, Agronomy, CASE Animal Science, 8th Grade Exploratory, and Horticulture.
- Agriculture Science (3 responses)
- Agriculture, Food and Natural Resources, Plant Science, Animal Science, Natural Resources, Greenhouse Production, Agronomy, Agriculture Business, Agriculture Welding, Agriculture Structures and Exploratory Agriculture
- Agriculture, Integrated Science, Biology
- Algebra 1, Algebra 1 Part 1, Algebra 1 Part 2, Geometry, AP Statistics
- All (35 responses)
- all - classroom teacher
- All - Elementary Teacher
- All / General Education Teacher
- All 1st grade elementary subject...reading, math, language arts, science, and social studies
- All 5th grade subjects (2 responses)
- All content areas
- All core subjects.
- All curricular areas
- All elementary academic subjects (2 responses)
- All elementary subjects (2 responses)
- all except PE, Music, Art (kindergarten)
- All except Social Studies and English
- All Gen Ed (3 responses)
- All school-to-work programming coordination: i.e. job shadows, internships, worksite tours, guest speakers and interactive career based exploration activities
- All- self-contained classroom
- All subject areas (31 responses)
- All subjects - first grade.
- All subjects (Math, Reading, Science, Social studies). (2 responses)
- All subjects 2nd grade general education
- All subjects but PE, music and art
- All subjects- elementary
- All subjects except Math. (2 responses)
- all subjects in first grade
- All Subjects in Kindergarten
- All subjects. ELP / Gifted
- All subjects/elementary classroom teacher
- All, reading, math, science, social studies, spelling, English, phonics, etc.
- All-Elementary Classroom
- Anatomy & Physiology, AP biology, and biology
- Art & Gifted & Talented

- Art / Tag
- Art, Talented and Gifted, 21st Century Skills, Photography, Ceramics, Graphic Design
- Automation & Robotics
- AWIM
- Biology, Gen. Science, Ecology, Earth Science, Zoology/Botany
- Biology, Physical Science, Forensics, Advanced Biology, Wildlife, Environmental Science
- Biology, Zoology/Botany, Gen. Science, Earth Science, Ecology
- BLAST
- Business
- Business and Computers
- Business and Technology (3 responses)
- Business Education / Computer Applications / Automation & Robotics / Design & Modeling
- Careers
- careers and computer apps
- CASE Animal Science
- CASE Plant
- Chemistry, Physical Science, and an 8th grade exploratory
- Chemistry, Physical Science, and PLTW
- Chemistry, Physical Science, Earth Science, Pre Calculus, Physics, and Forensics,
- Chemistry, Physical Science, PLTW
- Children's Librarian
- Classroom (2 responses)
- Clint Gentry, HyperStream Teacher Champion, teaches math and computer programming at Valley High School. Debbie Dean, HyperStream Ambassador, is a Senior Program Director at General Dynamics Information Technology.
- Computer Lab
- Computer Literacy
- Computer Science
- Computer Science and Engineering
- Computer Technology
- Computers and TAG
- Counseling & TAG
- County Youth Educator
- Curriculum--All grades, areas
- Design and Modeling
- Design and Modeling, Automation and Robotics
- Discover 4-H - monthly STEM after school program / Extension youth educator (3 responses)
- Earth Science (2 responses)
- Earth Science and Life Science
- Earth, Life, Physical science
- ELA & science
- Electricity
- Elementary (3 responses)
- Elementary - All curriculum
- Elementary - All subjects (2 responses)
- Elementary Education
- Elementary General Education
- Elementary General Education: Reading, Math, Science, Language Arts, Spelling
- Elementary Principal
- Elementary School Substitute
- ELP (Gifted)
- Engineering Is Elementary - Engineering Aid Drop Packages
- English Language Arts and science
- English, Science, Computer Skills
- English, Spelling, Reading, Math, and Science
- Environmental Science, Earth Science
- ESL
- ESL and Science
- ESL and Talented & Gifted
- Extended Learning Program and Library
- First Grade
- First grade-all subjects
- Full Day Kindergarten
- Gateway to Technology and Science
- Gen. Ed. Teacher / Plants and Life Cycles
- Gender specific leadership development
- General classroom (literacy, math, social studies, science)
- General Education (12 responses)
- General education: second grade
- Geography, Math, Automation & Robotics, Science, Math Academy
- Gifted and stem
- Gifted and Talented (2 responses)
- Gifted and Talented (all subjects)
- Grade 3 Classroom Teacher
- GTT
- GTT- Design and Modeling
- GTT PLTW, 6th-8th grade Computers classes / Design & Modeling 6th / Design & Modeling 8th / Automation & Robotics 7th
- GTT/PLTW/Industrial Tech
- High School Agriculture
- High School Agriculture- Plant Science, Animal Science, Intro to Agriculture, Agronomy, Ag Mechanics, Welding, Ag Business
- High School/Middle School Agricultural Science Education
- Home School Assistance Program K-6 all subjects but mostly Science and Math.
- Homeschool enrichment classes in Spanish, writing, and science.
- I am a contracted educator with Science Center - I teach a variety of Science, Engineering, and Technology units on site and as outreach to schools and Boys & Girls Clubs.
- I am a Senior Program Director at General Dynamics Information Technology and serve as a corporate Ambassador for the Valley High School HyperStream program in West Des Moines.
- I am the Youth Co-Coordinator for 4-H. Our programming involves: STEM, arts and communication, citizenship/leadership, and agriculture and natural resources.
- I am the youth coordinator for the 4-H program in Washington County. I teach on a variety of topics from nutrition to engineering to farm safety.
- I provide professional learning for teachers and administrators.
- I teach all of the subjects in a general education kindergarten classroom.
- I teach all subjects as a 3rd grade classroom teacher.
- I teach all subjects in a self-contained classroom
- I teach Physical Science and co-teach "Gateway to Technology"
- I teach Physical Science, Environmental Science, and all Agriculture classes (Introduction to Ag, Animal Science, Plant Science, Ag Mechanics, and Natural Resources.).
- I teach positive youth development programs in Clinton County.
- I used to teach Art. Now I lead programs with the Clayton County Extension Office.
- I work in Extension and coordinate youth and 4-H programs.
- I work with homeschool families as a supervising teacher in a HSAP. I taught PE, math games & AWIM JetToy Challenge this year. I have taught a variety of enrichment classes to grades 2 - 9.

- IED at the Hawkeye Community College extension office in Independence, Iowa. GTT at East Buchanan Community School, / Metals, Introduction to CNC, CAD / Drafting (Mechanical/ Architectural), Electronics, Introduction to Technology, Small Engines, Introduction to residential construction, Introduction to Woodworking, Advanced Woodworking, Engineering Technology, and Computer Graphics.
- I'm the director of the St. Edmond After School Program.
- Industrial Tech & PLTW
- Informal Education (2 responses)
- Informal educator, do not teach specific subject. 4-H many project areas.
- Insect Adventures
- Intro to Agriscience A, Intro to Agriscience B, Agronomy A, Agronomy B, Animal Science A, Animal Science B, Agricultural Leadership, Biology A, Biology B
- Intro to Programming, Computer Graphics, Web Design, I.T. Essentials, C++ Programming, Java Programming
- Intro to Programming, Java Programming, C++ Programming, Web Design, Computer Graphics, I.T. Essentials
- Introduction to Agricultural Education AFNR, Introduction to Agricultural Education 2
- Junior and Senior High Industrial Technology
- Junior high science, physical science, biology, chemistry (2 responses)
- K-12 Extended Learning Program
- K-12 TAG, 7th Life Science, 6th-8th Tech
- K-12 Talented and Gifted
- K-12 Talented and Gifted, 7th Life Science, 6th-8th Technology
- K-5 TAG
- K-8 Talented and Gifted
- Kids Club does not have 'subject' areas. We have a monthly theme, that the children choose, and we develop curriculum around that theme.
- Kids Club is pretty much a daycare...
- Kindergarten (2 responses)
- Kindergarten: math, reading, science
- Land and Water-Carolina Curriculum
- Language Arts (Reading, Writing, English, Spelling) / Science
- Language Arts, Math, Science, and Social Studies
- Language arts, math, science, social studies
- Language arts, math, science, social studies, social skills
- Language arts, science & social studies
- Language arts/reading, math, science, social studies
- Language, Math, Science, Social Studies
- Library afterschool program
- Life and Physical Science
- Life Science (3 responses)
- Life science & Civics
- literacy, math, science
- Literacy, Math, Science, Social Studies, Technology
- Literacy, Science, Social Studies, Math
- Math (4 responses)
- Math - / Alg 2 / Basic Alg 2 / Pre-Calculus / Technical Math / Applied Math / AP Calculus
- Math / Science
- Math and Literacy - / I tutor - Piano, Math, Science, Geography, Literacy, History, and art
- Math and Science (5 responses)
- Math and STEM Classes
- Math, language arts, science, social studies
- Math, Literacy, Science, and Art
- Math, Reading, Spelling
- Math, Reading, and gifted ed
- Math, Reading, Language Arts, Science, Social Studies
- Math, Reading, language, science, social studies
- Math, Reading, Language, Spelling, Science, Social Studies
- Math, Reading, Science, Social Studies
- Math, reading, science, social studies, language
- Math, Reading, Spelling
- Math, Reading, Writing, Spelling, Science
- Math, Science, Language Arts, Health
- Math, Science, Language Arts, Religion
- Math, science, reading, English, spelling.
- Math, Science, Reading, Language, Writing, Social Studies, Health
- Math, Science, Social Studies, Language, Writing (2 responses)
- Math, Science, Social Studies, Reading, Language Arts (4th grade ~ self-contained)
- Math/Science (3responses)
- Mathematics and programming
- Mathematics, science, language arts, social studies, technology, and religion
- Middle School Math / Middle School Science
- Middle School Physical Science
- Middle School Science and High School Physical Sciences
- N/A I am a volunteer for the Clover Kids 4-H program through the ISU Extension Office
- N/A / Villisca Before & After School Program
- NA (4 responses)
- None (3 responses)
- Non-formal education - focus on STEM, healthy living, citizenship, leadership, communication, arts
- Non-formal education in STEM, healthy living, leadership, citizenship, communications and arts
- Non-formal, out-of-school, science, math and social studies
- Not applicable - informal educator ISU Extension and Outreach
- Physical and Earth Science, Chemistry, Forensics, & Renewable Energy Technology
- Physical and earth science; forensics; chemistry; and renewable energy technology
- Physical Science (8 responses)
- Physical Science and Earth Science
- Physical Science, Chemistry, and Environmental Science
- Physical science, college biology, adv. chemistry, chemistry, physics, basic/general science
- Physical Science, Physics, Pre-Calculus, Chemistry, Earth Science, Forensics, Robotics
- Physical, Life, and Earth Science
- Physics, Chemistry, Physical Science, Earth Science, Forensics, Pre-Calculus
- Physics, Physiology, Biology
- Plant Science
- PLTW Design and Modeling, PLTW Automation and Robotics, 6th grade technology, 6-7 grade reading and language arts.
- PLTW GTT, IED, POE
- PLTW-GTT-DM and AR / High school extended algebra and business consumer math
- PreK - General Ed
- Preschool - all subjects
- Primary - (all subjects)
- Principal
- Project Lead the Way, Science & Engineering
- Project Lead the Way, Technology, Reading/Language Arts, TAG
- Project Lead the Way-Gateway to Technology: Automation and Robotics

- Reading (2 responses)
- Reading Specialist, work with the district's data, state and federal reports along with grant writing
- Reading, English, Science, Math, Religion, Spelling
- Reading, Faith Formation, Science
- Reading, Lang. Arts., Math, Spelling and Science
- Reading, Language Arts, Math, Science
- Reading, language arts, science
- Reading, Language, Science, Math
- Reading, Math
- Reading, math, spelling and social studies, Science- Land and Water
- Reading, Math, English, Handwriting, Spelling, and science (to four sections of third grade)
- Reading, Math, English, Spelling, Science, Writing
- Reading, Math, Faith Formation
- Reading, Math, Language Arts, Social Studies, Science, Religion
- Reading, math, science
- Reading, Math, Science, Language
- Reading, math, science, social studies, language (3 responses)
- Reading, math, Social Studies, Phonics, Science, Handwriting, Religion, language Arts,
- Reading, math, social studies, science (Changes), spelling
- Reading, Math, Spelling, Writing, Science, Religion
- Reading, Math, Writing, and Science
- Reading, math, writing, science and social studies
- Reading, math, writing, language, science, social studies, health
- Reading, Science, Math, Health, Social Studies
- Reading, spelling, math, language, and science
- Reading, writing, math, science and social studies
- Reading, Writing, Math, Social Studies, Science, Technology
- Reading, Writing, Science, Social Studies, Math
- Reading, Writing, Spelling, Math, Social studies, Science, Computer
- Reading, Written Language, Science
- Reading/Language Arts, Math, Science, Social Studies
- Reptiles and Amphibians
- Robotics, biotechnology
- Scales and Tails (2 responses)
- Science (36 responses)
- Science / Reading
- Science - Plants/Life Cycles
- Science & Health (3 responses)
- Science / Family Consumer Science /
- Science 7th Grade, PLTW DM, PLTW AR, RtI reading class, VREP
- Science and Reading/Language Arts (2 responses)
- Science and PLTW GTT
- Science and Social Studies (9 responses)
- Science coordinator, K-12 for the district
- science reading
- Science to four sections of third grade, math, reading, English, handwriting, spelling
- Science, language arts, 21st century skills, art
- Science, Math and Reading
- Science, Math, English, Reading, Writing, Social Studies
- Science, math, literacy, language, social studies
- Science, Math, Reading
- Science, math, reading, language, social studies
- Science, math, reading, spelling
- Science, Math, Reading, Writing, Social Studies
- Science, math, reading, writing, social studies
- Science, math, social studies
- Science, math, social studies in an out-of-school learning setting
- Science, Mathematics, Language Arts
- Science, Reading
- Science, Reading, and Family Consumer Science
- Science, reading, English, spelling, math
- Science, reading, written language
- Science, Reading, Language Arts
- Science, social studies
- Science, Social Studies, Language Arts
- Science, social studies, math, reading, and writing
- Science, Social Studies, Reading, Language
- Science, Social Studies, Reading, Writing, Math
- Science, Social Studies, Spelling
- Science-Earth and Middle / GTT AR and DM--Project Lead the Way
- Second grade: all subjects
- Self-contained 6th Grade
- Seminar for Advanced learners and a game based elective
- Spanish
- Special Education (3 responses)
- Special Education & After School Program
- Spelling, Guided Reading, Language, Math, MTSS, Science, Whole Reading, Social Studies
- STEM (3 responses)
- STEM programs for youth and adults, this includes 4-H programs and activities, volunteer leader training, etc.
- STEM, biology, chemistry and physics
- STEM, leadership, communications and agriculture in the classroom.
- Talented and Gifted (9 responses)
- Talented and Gifted with Integration across the curriculum
- Technology (5 responses)
- Technology Education and PLTW
- Third Grade Language Arts and third and fourth grade science / (Spelling, Phonics, Grammar, Writing, Reading...
- Title I Math and TAG (2 responses)
- Winging It
- Work with K-12 Youth in a variety of subjects
- youth development, STEM trainer, after school trainer

Appendix N: Regional Scale-Up Programs_Other participants

Prepared by Research Institute for Studies in Education (RISE), Iowa State University

- 8th graders
- Science practicum student (college level)
- Preschool students
- Two science teachers
- TA, Engineer
- 1st - 4th graders
- 1st graders
- I had a geologist come in and speak with my classes.
- 5-12 students
- K-12 administrators
- Local businesses
- Preschool students
- First graders
- College students
- SVPP - State Voluntary Preschool Program
- 7-12 students
- Brittney Tiller, LCCB
- Community volunteers
- I trained after school staff who presented materials to K-5th grade students.
- 7th-12th grade, including mentors from Berkley Technology Services
- Mentors
- K-3rd grade
- Partnering Agency Staff, Harrison County GIS, Harrison County Emergency Management, Little Sioux Scout Ranch, Loess Hills State Forest
- Community volunteers
- Mentor
- K-4th grade students
- K-4th grade
- Community volunteers
- This year the district's science teachers worked with Defined STEM.
- 9-12 students
- STEM coordinator
- Engineers from ALCOA Classroom associates
- Technology director and programming teacher
- Girl Scout volunteers
- 7th and 8th grade
- Expert engineers
- Two engineers from Alcoa
- Preschool
- Volunteer 4-H leaders; HyperStream ambassadors
- Nick Rissman (Howard Country Engineer)
- TK-7 students
- Special Education Teacher, Associate
- EZ Way, Inc.
- Volunteer leaders and PreK-12 teachers
- After school program
- Transitional Kindergarten students (those who are 5 but not ready for Kindergarten)
- Kindergarten students
- 6th Science
- 9-12 students
- Teachers reviewed the website
- 4-H Club Leaders
- Teachers, Des Moines University, Grundy Center and Parkersburg emergency management services, Unity Point LifeGuard, Grundy County Memorial Hospital Staff
- Volunteer from the hospital
- 2nd grade classroom
- 6-12 students
- Grades 10-12
- Retired engineer
- Professional Development Students, Clarke University
- 8th grade students
- Mentors from business
- Beth Lynch, professor, Luther College
- Preschool

Appendix O: Regional Scale-Up Program_Open-ended responses related to implementation of Scale-Up programs

Prepared by Research Institute for Studies in Education (RISE), Iowa State University

Changes in Implementation of Scale-Up Programs

- Did not get to the playground but completed pegboard toys.
- We made the program an after school program where students stay after school for around an hour and a half to do activities. We are implementing it each Monday after school for 7 weeks.
- Some of the wording in the curriculum needed to be taken down for second and third graders. Added a couple crafts to add impact.
- I provide other instructional materials and techniques as I go through the STC kit.
- We allowed students to choose materials to use rather than give them a materials list. We allowed students to design vehicles in teams rather than follow a guide of what vehicles should look like.
- Does not go with the SWH program our school is involved in.
- We are inquiry based and allow students to lead in questioning.
- I originally intended to utilize a different Carolina STEM kit. With having to select an alternate kit, the time frame and content focus varied from my original plan.
- I break up the day camp agenda and spread it out through the Clover Kids year. (October thru May)
- I had already covered earthquakes and started volcanoes, so I used this kit midway through that unit in September. Then I used the igneous rocks in my rock unit in December.
- I used the materials as needed and only used sections of the texts that applied to my curriculum and would fit within my given time frame to cover the content.
- Made a little more open-ended for students to use their inquiry.
- Used pieces of the lessons and the materials.
- Used parts I needed.
- We extended the time so that Design and Modeling was 9 weeks and Automation and Robotics was 9 weeks also.
- I had issues with the technology that I purchased, the fuel cells would not work and so we were unable to fully complete that portion. I created structured charts for the 8 and 9 year old children to record their data collected from the nine different tests performed on twelve different minerals, as well as tables for observations on the twelve rock samples, to replace the lined notebook paper provided for them to record their data. I also incorporated two lessons from our original rocks and minerals unit into the unit. I recreated the test using the test provided by Carolina STEM as well as generating my own questions.
- Made it fit local curriculum.
- Some activities were too hard for my age level.
- I added newspaper headlines, an Invasive Species Poster from Australia, and allowed children to create a trap for a different timeframe of the animals' lifecycle.
- Many of the activities were meant for outdoors, so we had to change things for doing activities indoors.
- Due to our ag class schedule being all semester classes and already in place, I was only able to teach the first half of the course.
- We skipped a few units due to time constrictions.
- Since this is my first year, the supplies where overwhelming and I did not do all the labs as intended or the "build an earthquake resistant house" extra curricular activity; however, I followed the program fairly closely.
- Due to the weather, I had to switch a few lessons around.
- I made a flipchart used on our promethean whiteboard and also made an extra student journal to use in addition to the journal pages provided in the teacher manual.
- Began with AR instead of DM due to lack of computers; have modified lessons as needed for time allowed per quarter with each class.
- Had to scale the lessons down due to time constraints.
- Because of late starts and early outs due to weather, minor curriculum changes had to be made to finish the program in an acceptable amount of time.
- Used with my sixth graders.
- Did not implement the program due to scheduling.
- Some revision of lessons required as I taught it whole group rather than as a small group center.
- Some of the lessons were excluded because of time limitations.
- Had to fit into current science curriculum (studied concurrently).
- We spent a longer amount of time on it than they suggested.
- Expanded beyond gifted classroom to first grade regular students.
- We took longer.
- Due to the age of the students, we modified the recording sheets and completed them in small groups with teacher serving as the recorder for the students.
- We did one activity per day twice a week.
- Schedule changes due to school schedules.

- Used the program with Project-based learning. Students needed some additional supports to complete tasks so created a Google docs to help students.
- We only had 9 camp days, so we only chose 9 lessons, not the whole program.
- Changed some lesson plans to meet the academic and behavioral needs of the students.
- The program was scaled down for our 45 min program meeting twice a week.
- Groups were larger than outlined in the book to accommodate supplies.
- It was the same kit as a previous grade has so I did not want to overlap. When I got the kit I was not aware it was the exact same curriculum, I did not want the kids doing it back to back years.
- Some of the lesson at the end I combined.
- I included all middle school rather than just 8th grade.
- Made small changes to make program more applicable to youth in program.
- Some prior developed curriculum included.
- The time frames stated for each activity were not long enough so changes had to be made based on that issue.
- Left out some things from the kit as it was a very long unit.
- Some of the content was too advanced for my students so we spent extra time on vocabulary as well as giving different definitions for the students to understand. I didn't do all of the worksheets that were given in the unit.
- I did the Jet Toy Challenge with the 5th graders and the Glider Challenge with the 6th graders. I had to condense the Glider Challenge activities due to lack of time.
- Upgrade questions and worksheets to high school level.
- Added more information on some of the vocabulary terms.
- For the Gravity Cruiser, we combined the lessons and had more inquiry based student building time.
- Skipped some lessons.
- Completed the Literacy portion in small groups rather than large groups.
- It will work better when it is what we are currently teaching about.
- Some of the activities also fit in horticulture and greenhouse production so a few activities were used in multiple classes.
- I did not receive the materials until last week so I have not implemented anything.
- Kit did not arrive on time to implement this year.
- I have been unable to implement the program because materials weren't received in time to implement.
- Change of both instructors of the two-teacher department over the course of the school year - one long term sub and one brand new teacher.
- Our schedule only allowed 25 minute of science every other day so I could not complete the entire program.
- Sometimes we didn't have time to complete everything or have the correct equipment.
- Shortened the recommended time period by consolidating some of the lessons.
- Did not go in order with the days. Skipped over some activities as they looked very difficult for our age group.
- We didn't get to do the puddle activities yet due to snow in the winter in Iowa.
- Started out working as groups but switched to individual projects.
- I had to shorten the amount of recommended time on each lesson.
- I had to leave off the last lab about yeasts because my class periods are too short (45 minutes). The unit was intended for 90 minute periods.
- It is a 3-5 Curriculum and we teach second grade, so we modified some of the readings, and read them aloud.
- I taught the DM classes to the 8th grade so they would have both before entering HS since it was the pilot year.
- Had it as a "Club" instead of a class period.
- The students wanted to planes instead of parachutes, so we talked about the different elements that are part of the parachutes unit. We also talked about what is engineering and what is technology and did the Engineering Design process with our planes unit.
- I only implemented the first series of lessons. Given the structure of out of school programs, we didn't have time to implement all of the curriculum.
- The book and activities in the prep lesson and lesson one were not engaging enough for lower level students. Added in other books, split the Javier book into smaller chunks, and practiced bridge making like the characters did in chapter 6 of the book before moving on.
- All due to an emphasis of having more junior high students than expected.
- We didn't have regular attendees and so we had work with the students that came.
- Did not use all journal (writing) pieces (2 responses)
- Some independent writing activities (2 responses)
- Modified the reading material.
- We modified the reading material and read aloud more than students read independently.
- Meet daily for 30 minutes rather than 50 minutes at one time.
- Meet daily for 30 minutes.
- Modifications to the reading portion/ didn't use the wicking system.
- We made a few adjustments to lessons but didn't change content.
- I completed each kit for 3 weeks because of time constraints.
- Didn't use all the labs. Picked and chose the ones that went with curriculum
- The group started with high school interest, but stayed strong in the junior high only. Mentors were not available.
- Defined STEM was used for student project choices to analyze concepts in addition to inquiry projects from our iScience textbook, KidWind, and modules from the Innovative Technology in Science Inquiry portal by Concord Consortium .
- Some adaptations were made to incorporate the curriculum with our school's 1:1 program.
- Over a shorter time period from 8 weeks to 6 weeks.
- We did 4 mini-sessions of programs. We met 4 times within each session. 2 sessions were for K-2nd, 2 session for 3rd-5th.

- I had originally applied to use a different curriculum for a summer program. But I was told funding was available if I wanted to use EiE. I decided I could use EiE but then realized the data were due by 5/16 so had to change from a summer program to an out of school program held on several Saturdays.
- We did not gain new partnerships with area STEM industries as of yet, though this is a still a possibility for future programming.
- Included a STEM unit on wind energy within the course.
- We also read about weather from our current science curriculum.
- Experiment designs were modified to fit SHW investigation practices.
- I used fewer powerpoints and I also included other non-PLTW projects using legos, knex, and other products
- The program seemed too advanced for my young kids, but when given specific examples and similar vocabulary words, they understood concepts better.
- We introduced and offered AWIM to Dordt College and Northwestern College Education departments. At this time they have not had an opportunity to implement AWIM. We did work with the Mad Scientists 4-H club. We have grown our partnership with Post Equipment and the Orange City Area Health System. We hope to create opportunities in the future to add partnerships with other area STEM industries.
- Experiment designs were modified to fit SWH investigation practices.
- Had a guest speaker come in, as well.
- We unfortunately did not provide tours of the Dordt College Engineering Lab as hoped. However, we did offer sessions for participants throughout Dordt College's Science Building (including the Engineering Lab) during STEM Fest at Dordt College (we used two EiE lessons during this event). We still plan to use EiE in the camp setting in the future.
- We did not gain new partnerships with area STEM industries as of yet; however, we plan to identify and pursue new partnerships for future programming.
- Rain created an indoor environment for the entire project.
- We implemented AWIM in our Mad Scientists 4-H Club. We supported volunteer leaders to present the activities. This gave youth an opportunity to experience The Fuel Cell Car, The Motorized Car and The Gravity Cruiser. This non-formal learning environment allowed youth to engage in hands-on, learning and older youth served as mentors to younger youth. We were partnered with Northwestern College Education Professors to offer a STEM training that included activities in AWIM. Nathan Sexe, Northwestern College student and Iowa State University Extension and Outreach Intern, was given the opportunity to create summer day camps focusing on AWIM kits. We will offer summer day camps focused on STEM and use AWIM kits to develop activities. The STEM event at Dordt College did not allow time to use AWIM. We did partner with Orange City Area Health System and Post Equipment. We created a new partnership with Tony Rau and Valley Machining Company. We hope to increase our partnerships with local businesses and Dordt College.
- Experiments were modified to fit the SWH approach.
- Experiment designs were modified to fit SWH investigative practices.
- We held our meeting and work time during the school day. I implemented it into my curriculum for a Productions class.
- We use SWH already to teach science, so I used the majority of the activities as mini investigations and some of the readings as sources during the investigations.
- We did not get through all the materials.
- We take longer than the three weeks.
- Did not compete in the competition.
- I followed each unit but changed some of my assignments I used to address each topic. I adjusted most of the drawing unit for the things I have done in the past. They covered the curriculum but I did them my own way.
- This year was focused on teachers becoming familiar with Defined STEM and its hope is to start having more student engagement with it.
- Few labs had to grow materials representing our region, not as many students in actual class that had signed up the previous semester.
- We will use Defined STEM in our 4-H summer day camps. We offer day camps to 4th-8th grade youth. The camp focus in which we are using Defined STEM challenges is a farm to fork camp. We identified the food challenge of creating a restaurant featuring local foods. By implementing the challenges outlined in Defined STEM we are adding inquiry, team work and multiple disciplines to the learning that will happen in this camp. We have summer educator hired to present the program in four counties. Maximum number of participants per county will be 20 per camp.
- Adjusted some activities and incorporated materials from a FOSS kit as well.
- We met for 15min/once a week.
- Because of an ordering glitch, I did not receive my Carolina Kit until the end of November, 2013. I used other classroom materials to introduce the unit while waiting for the kit. When the supplies did arrive, we began with the plants unit. Because of the time of the year, there were many breaks throughout due to vacations and weather related issues. Also, the classroom environment was not conducive for living organisms, due to the temperature of the room. This program, Carolina Organisms, would be a great program to use if one began the lessons in the fall.
- Adjusted some of the assessments.
- Since this was so new to the students, I started with the company logo and slogan to get them acquainted in their groups.
- Minor scheduling changes ~ suppose to be March and April but program delivered later.
- We were unable to use some of the materials used in some of the experiments.
- We broke it down into two different days 3 hour sessions each I didn't hand out some the handouts (there were tons) and rather just read some to the kids.
- We also looked into our science unit and incorporated it with the program.
- Skipped a few activities.
- Lessons were too difficult for second grade so we altered them for their level.
- Meeting times changed and fewer mentors.
- Instead of using chemical engineer audio cd, I broke the text into parts and we discussed chemical engineers. The audio cd went too fast for 2nd graders to understand. I would also suggest that there were video when introducing a chemical engineer.
- The curriculum was geared for 2nd grade and above so I adjusted it to meet my students’ abilities.

- We were unable to do all of 8th grade due to scheduling.
- Not all staff were able to make use of the program due to time this year.
- Fit it what was required of your school district.
- We had a larger number of students so I had students build their ecocolumns in groups of 4.
- Integrated it into the Car Olympics project that I teach every spring (students create balloon/inclined plane cars made of straws/paper.
- Added more formative assessments.
- The Motion and Design STEM kit was designed for grades 3-5. Since the 6th grade did not get a kit, I adapted it to work with our force and motion standard.
- Our intent with this program was to offer the World in Motion programming to girls in a number of programs throughout the council. Unfortunately, we had challenges in getting girls to register for the programs in the fall. Three of the planned events were cancelled due to low registration numbers. We regrouped and adapted other events we had planned to include World in Motion. We were able to offer the program in all 5 regions that we serve. Additionally, we did mini trainings for our adult volunteers who were interested in a more in depth opportunity and shared the entire program with them to implement with their girls.
- I did not do Lesson 7 because of the time-frame. Because of the nature of my student population, I explicitly taught reading comprehension strategies for the assigned readings.
- Combined lessons and cut some out because of time. Also, no guest speakers.
- We were 5 or 10 minutes short on some occasions.
- Added more technology such as google presentation, photos videos, drawing programs.
- We are an afterschool club so we had to condense eight weeks of lessons into ten days.
- I wasn't able to get started as soon as I had hoped. I will change the timing of my unit scheduling in the future. It was fantastic!
- Adjustment in available materials, excluding labs without adequate materials, etc.
- Did not do all Inquiry activities.
- Some of the time allotments were shortened.
- Didn't always have student journal responses.
- Used the scoreboard before the last lesson
- The program was part of an afterschool program and kids were allowed to come and go. We omitted a couple activities. The timing of activities was also adapted.
- To fit the nature of my classroom.
- More time to explore on their own after lessons.
- In our first year, we had robotics and web design. Because of student interest, we added game design and multimedia in our second year.
- Did not reach final unit.
- With all of the snow days, I was not able to start as early as I planned, so did not get through all of the sections I had planned to cover.
- I did not do every activity in the manual due to time constraints.
- Used in a day camp setting. Did not use activities in order of days.
- We added working with Arduinos.
- By grade level instead of multi-grade level.
- We adjusted the groups based on attendance.
- Due to time and available space, some activities were not used. Kit was supplemented with our textbook series.
- Supplemented with nonfiction literature (Science Vocabulary Readers).
- We missed a few lessons and had to do some out of order due to the amount of time we had available each day.
- We were not able to do all the activities.
- I adjusted a few of the pages to make them more appropriate for my class's ability.
- We meet for 45 weekly for elementary TAG. Some minor changes in sequence and timing to make sure we completed the material in provided schedule.
- Pacing guide due to block scheduling and quick review of some material because of prior knowledge.
- Only looked at the rubber band gliders.
- Some of the experiments that were too involved for the TK, K, & 1st grades were done as demonstrations. This way they could see the experiment being done and then talk about the outcome of the experiment. It worked really well. There was a lot less confusion on the part of the kids and what was being done. Yet they could still see what was happening and draw conclusions about it.
- Supplemental materials and packets.
- Time management to accommodate all students.
- Had to cut out some portions to fit into a 1 day a week after school program.
- Shortened some of the content (only had one week to do the JetToy and the Skimmer and one week to do the Gravity Cruiser).
- Curriculum was used as an after-school STEM program.
- We met once a week for 6 weeks, so I had to adapt how I got through all the lessons within that time frame.
- Modified to include some individual experiments, not just small group experiments.
- I had to use the internet as a big resource for me.
- I used lessons in all classes instead of just the entry-level class.
- Because of weather, some of my programs did not happen so I served about 15 fewer kids.
- I wasn't able to obtain guest speakers as desired; Hyperstream did not provide me with mentors.
- I edited some of criteria, descriptions and rubrics on the Defined STEM website, in order to fit the needs of my students.
- To best suit our time frame and large group sizes we will have to cut out an activity for each session.
- Altered depending on current weather, did not read aloud umbrella story.
- We have six enrichment classes and I was required to condense the number of lessons and activities I could use.
- We plan to use the curriculum in a summer science discovery camp format. Students will attend 2.5-hour sessions for 5 days at a non-school location (usually a park). I will be teaching classes of around 20 students ranging in ages from 5-11. I will have an assistant working with

me, as well as parent and community member volunteers. We plan to implement most, if not all, activities as closely as outlined in the curriculum.

- Didn't use as many of the worksheets.
- Shorter time periods and not all on consecutive days as I had planned.
- Time and schedule determined the amount of time spent on curriculum. Limited classroom space for lab as limited curriculum.
- Did not meet many criteria that I was teaching.
- Lack of some equipment and supplies prevented me from implementing some lessons.
- Instead of a continuous "all-at-once" unit, I did other curricular work between activities. This was due to missing supplies in original shipment and it allowed me a few days to get all lab journals checked.
- Not implemented with students.
- Defined STEM is being offered as a 2014 4-H Fair Class for 4-H'ers in Plymouth, Woodbury, and Monona County. 4th-12th graders may choose to participate in the 3 classes that have been created: Wind Energy Business, Engineering Space Robots, and Restaurant Owner: The Clover Bistro. Exact data on who participated and how it went will not be available until after the fair season is over.
- Included the changes in life cycles of plants and animals.
- I did a different schedule different from the pacing guide.
- The contracted company to assist with the planning was unable to secure an opportunity for exploration at a community college or university. We also had to combine the age and empathy day due to lack of student participation. I think the thought of aging and empathy did not connect with them making them not want to sign up.
- Added books and videos and modified some of the activities.
- I was not able to take as much time as I had planned but I intend on using this again next year in a STEM class.
- Adjusted time spent on each unit.
- Some of the curriculum was too intense and some of the activities were too long so I shortened them.
- Due to a 3-hour time restriction, we just hit the highlights.
- I changed the curriculum and used materials in other classes to implement CASE aspects to all of the Ag Ed Classes.
- Shortened the 6 week unit to a little over a week due to other large projects and time.
- To fit the common core standards for third grade.
- Didn't have all the supplies need for all labs so modified the processes.
- Smaller time and groups due to weather.
- Didn't get a chance to teach all of the units that I ordered.
- I implemented the CASE - AS curriculum at a slightly slower pace than it suggests. Therefore, not all units/lessons were covered.
- Having to coordinate with another teacher in order to have access to PC lab (Inventor software)
- Used with all of my ag 1 students and then I also used parts with my ag 2 students.
- I did not cover some areas, for example, polling the consumers.
- I did not have the time to implement the program to it's fullest. I left some lesson out entirely and/or shortening lessons.
- It became bigger than I thought would happen.
- It changes every year based on the students and what their interests are.
- I was not able to cover as much as I had hoped.
- The students were frustrated with the Cyber Defense venue and we were not successful in gaining mentor in that field soon enough for the students to feel confident so they switched and dropped Cyber Defense.
- I felt that the Carolina materials were too prescribed for the SWH approach so I adapted the experiences to be less teacher directed and more student centered.
- We did not have enough students interested in other venues -- so we only did Multimedia.
- We did not complete the student surveys...we did our own informal one with them.
- I did not require students to follow the step-by-step guides. They were able to design their own models.
- We did not complete the student surveys...we did our own informal one with them.
- I only completed through lesson 7.
- We only did one unit because it was the first time I had used the kits and it was difficult to adjust our schedule mid year.
- I added background knowledge/activities with simple machines, laws of motion, friction, work, and inventions.
- Lack of materials caused content to be modified.
- Added some crafts and other games.
- I did not fully implement it this year because we received the materials late and started it later.
- Due to time we picked a few activities to complete.
- My original intent was to get another classroom involved, but we ran out of time for implementation. This is on the agenda for next year.
- In schedule was given approximately 22 class periods of 45 minutes each for both DM and AR
- Completed units 1, 3, 6 and 11.
- Modified a few of the projects for DM and only was able to create 3 robots for AR due to time constraints (as well as we had technology issues that hindered program at the start of the year).
- Used mainly in AG Science but implemented in other areas such as Agronomy.
- Due to snow days and many late starts I shortened some lessons.
- I had already started my Driving idea "Weather changes affect us day to day, season to season" so we had covered a lot of the vocabulary through our nonfiction read-alouds. We had also been keeping track of temp and weather prior to this.
- Some of the content was a little hard for my younger students so we spent some extra time on vocabulary as well as character identification. The names in the book were so hard to read I had to spend a day going through the characters so my students understood who was who.
- We were unable to complete a few of the experiments, as some of the materials were deemed unsafe for our group of students.
- I change some of the questions for more advanced ages and added a final research project to the area of Nepal we were studying.
- Held as an after-school event, twice a week. Minimal graphing. No formal presentation at the end (snow day).

Challenges and barriers faced in working with service providers

- After my training, I sent in all my requests for my materials. After 4 weeks I had not received my materials. When I contacted them they told me they had no record of my order or even the fact that I had received a grant. However, earlier they had told another teacher that I had used all the funding already. After I contacted my contact person they did give me the okay to order my materials again but in my frustration I ordered the wrong kits. When I realized the wrong ones came I contacted them again and was told they could not exchange them for me for the correct kits. Thus I ordered the kits I really wanted with my classroom money. Once I got this all figured out everything else went very well.
- All the materials we ordered in October were back ordered. We recently received the complete order last week so I have been unable to implement. I have been very discouraged with the ordering process.
- As the administrator, I was not included in any of the emails to the teachers to help them with dates and scheduling of information sessions or other items.
- At times I worried about too many presentations and not as many hands on activities for students—which is what they want. All hands on activities the student found very engaging. The provider was not very receptive to my concern. The program did not change.
- Barrier was communication and payment for training.
- By "service provider", do you mean AWIM / SAE? The one-day training was timely and a joy to attend. The materials and manuals were enough that I did not need any contact with SAE once I started teaching.
- Carolina was AWESOME to work with. They were in constant contact with me to be sure I had everything I needed and that I had my questions answered. They really were fantastic!
- Communication could use improve between parties.
- Contact with and responsiveness from the service provider was good. The alternate kit they suggested to fit my curriculum did not match the hands-on, engineering-focused instruction I was seeking through the use of a Carolina STEM kit. Consequently, I had to find a different alternate kit and send back the suggested kit, which required additional time and effort.
- Curriculum was great. Just not enough time to teach it all the way my school set it up in an explore-hex area.
- Did not have enough materials and a few informational items/concerns were not addressed.
- Did not really have any. It was just hard to know how the competition would go without seeing it for yourself first.
- Did not work directly.
- Didn't have much contact with them. It wasn't needed.
- Difficult to get in contact with them at first, but much better the second half of the year.
- Don't know who that is.
- EiE shuts down over winter break. Some difficulty tracking packages. I provided feedback about the audio CD introducing the chemical engineer being too fast for 2nd graders and ELL students to follow and suggested there be a video cd. Some of the PDF links are not correct on EiE website.
- Eight seeds per student is a lot for the cost of the seeds.
- Everything was great, materials arrived on time. The PD session at IWCC was very beneficial as well.
- Getting answers to questions in a timely manner.
- Having to upload multiple rosters to different locations.
- He was very easy to work with but had some scheduling conflicts.
- I am assuming our 'service provider' were our Kids Club supervisors in Ames? Each program required a substantial amount of preparation and study time before presenting to the kids. Therefore, I do not think it was feasible for our supervisors to know all that was necessary to know with each AWIM category...and be knowledgeable enough to answer any of my specific questions. Site supervisors responsible for teaching a category of AWIM were responsible to read, study, and prepare our own area of the program.
- I am not sure who the service provider is.
- I am not sure who you mean by "service provider" however if you mean the Boston Museum of Science whom we received all of our materials from then my responses are correct.
- I am still missing the pinball kit that I ordered. I am guessing the demand for these kits slowed down the process.
- I asked for the manual to be copied and mailed to me for the Glider Challenge. I could not get my disk to convert to English.
- I cannot answer your survey questions that need circles clicked! I can only answer your written questions.
- I did not actually have an opportunity or need to work with the service provider.
- I did not face any challenges or barriers because I had no or little contact with the service provider. (2 responses)
- I did not have contact with any service provider. The materials sent were FABULOUS and easy to work with. I appreciate the resources.
- I did not have much contact with the service provider. The materials and teacher guide we very helpful.
- I did not meet him/her at all. The teacher leader heard from him/her but I never did.
- I did not receive the kits until late in the year from A World in Motion. It made it very difficult to implement.
- I didn't have any contact with my service provider following our training. / I received several e-mails after implementing the program.
- I didn't have any problems with the program.
- I didn't personally have contact with the service provider, but our liaison had a difficult time receiving prompt responses to inquiries.
- I didn't really need to work with them this year. I did EiE last year and was pretty familiar.
- I didn't work with a service provider because I was not the contact person for the section above.
- I don't know who the service provider is.
- I felt the materials in the Carolina STEM electricity unit were difficult for the students to use and manipulate.
- I had no contact with the service provider. (8 responses)
- I had no problem working with the people at the Iowa FFA Enrichment Center, CASE or any of the equipment providers.
- I had none were available and readily able to assist me.

- I had some kind of problem submitting the order, though I still don't know exactly what the problem was. Luckily I contacted the provider and got it straightened out. Because of that issue, there was a delay in receiving my materials, but I did receive them in time to implement, so it worked out OK.
- I had to order my materials before I took the CASE training which made deciding what I needed difficult. And some of the things I ordered where back ordered.
- I have no idea who our service provider is. I had no contact with our service provider once I received my kit.
- I have only received email newsletters from my service provider.
- I never got to attend the second meeting due to winter months and 3 hours away. Contacted them and they said they would try to get one closer but they never did.
- I never met the service provider. I took over the program when our Children's librarian, who normally runs our after school program, went on maternity leave.
- I ordered my materials the beginning of December, knowing that I would need them the beginning of February and they did not come until the beginning of March. This made for a scramble for the programs that I needed the materials for in February. Thankfully there were offices around me that had what I needed.
- I personally did not have any contact with the service provider.
- I think the curriculum should be provided electronically. I communicate with students electronically via email and google docs. Almost all of my student task directions, feedback, and assessment is now done electronically. I am surprised that a STEM curriculum is not high-tech enough to be disseminated electronically.
- I thought the person was supposed to come back to train us on note booking but we never received that training.
- I took the training session this summer, so I really didn't need to contact the service provider.
- I was not in contact with anyone.
- I was not the main contact person so all I am able to say is that I went to the class where we learned about the items and was VERY excited about it. I found ways to use it in the Preschool classroom. We made orders and then I personally NEVER heard back anything until last week. So I have not done anything with it.
- I was not the original person listed on the Scale-up Program grant, as I was hired to replace that person this fall. However, the service provider helped to get things changed and lined up so I could take the training provided in the fall at Storm Lake and implement the program.
- I was told that I would need to contact the manufacturer of the product in order to get replacement parts. Once I did that I was told by the manufacturer that I would need to talk with the company that I purchased the product from, AWIM.
- I wasn't able to access all of the instructional materials at the beginning of the year. It took a couple weeks until PLTW was able to rectify the problem and grant me access to the materials I needed.
- I'm a little confused on the reimbursement for the sub cost. How do I get that?
- I'm not sure if you simply mean my contact representatives or my PD Workshop Instructors???? I enjoyed the initial meeting that helped me get oriented with my Ecosystem Curriculum, meet others using Carolina Kits and answering questions/providing resources etc. I also attending the note-booking workshop which gave me some great information I can and will use! Otherwise I received many emails just letting me know they were available whenever I needed.
- Implementing for different pace workers.
- In working with Iowa FFA Foundation staff, it was sometimes difficult to receive the materials needed in a timely manner.
- It claims to be inquiry based, yet the students are told exactly what they will need to perform the experiment and what the outcome should be.
- It is a great program! I did try to contact them about some questions on how to do something, but never heard back. I adapted and it worked very well in my classroom.
- It took a long time for the materials we ordered from AWIM to get to us.
- It took quite a while for us to receive our materials. Other than that, no issues.
- It was a fantastic experience for us!
- It was a loss to the program to not be able to use the funds to take the students on STEM related field trips. The STEM field trips to the Mini Medical School, UI Geology Dept., UI Engineering College, Mississippi River Museum, Putnam Museum, UI Macbride School of the Wild Week, Kent Park Environmental Education Center, and the Iowa City Childrens' Museum where the students could participate in STEM activities and see college students/adults in STEM careers.
- It was a matter of figuring out what I needed to do for the course work and materials; once I knew what needed to be done things went well.
- It was against my contract with the school district to sign the MOA. I had to give it to the school board and it was sent on to district lawyers before I could proceed with ordering. I ordered my materials very late and was rushed to complete the project in the time frame required.
- It went well! (2 responses)
- It would be nice if the scale up teachers were also the main contact person. In our district, there is a time lapse having to go through the middleman to get anything accomplished.
- It's difficult, because I wear so many hats in the District, to facilitate. I am working toward adding a parent group to aid in our endeavors!
- Just distance was our only challenge.
- Just getting started at beginning of year, now things are going well.
- Large school district, we worked through a science lead. She did a fantastic job coordinating but I did not make direct contact with service provider.
- Like all grant funded programs, the paper work and documentation is overwhelming.
- Lynne Campbell and Julie Gagne were tremendous help! They always responded very timely!
- Many factors were unknown about the grant when I applied. This fall my questions were answered however.
- Materials were late (5 responses).
- My contact people, especially Angie DeMoss, were wonderful. I had several issues with equipment/supplies: most glassware was broken in the initial shipment and supplies and equipment were missing. Sometimes I didn't realize it until I was setting up the activity. Ms. DeMoss was prompt in responding to those issues and helped with whatever interfered with a successful experience.

- My only complaint would be that at times she flooded us with emails requesting much more information/surveys/documentation than I had anticipated. As a busy teacher, this was at times a burden.
- My principal received an overdue notice from the company about a bill that I had already contacted them regarding when I received the kits and the original bill.
- My service provider was there to order supplies from but never contacted me otherwise. All contact was from me.
- My training check got mailed to a school in another city with the same name. It took some time to get that straightened out and receive reimbursement, but it was all good in the end.
- N/A (12 responses)
- Never saw them. I was not the contact person.
- No problems with service provider, very accommodating.
- No problems! They were great. When I was missing a video from my kit they got it delivered as quickly as they could!
- None. (76 responses)
- None as my service provider was very helpful and informative. Wonderful to work with!
- None really, just my first time and had learning curves
- None really. I will say that I think the kits from AWIM are over priced for the supplies we receive.
- None really...if they didn't know they connected me with who did. Good training and very responsive.
- None, they were excellent! (3 responses)
- None, they were very helpful and responsive. They even provided me with an Iowa teacher who had taught the unit in the past so I could ask questions of her and get helpful feedback.
- None. I even enjoyed having Tamara for a virtual club meeting.
- None. Tamara was always available and provided lots of information. I wanted a little more help with the mentor recruitment however.
- None. The service provider was someone I could talk to about my frustrations and they helped me to solve the issues at hand as well.
- None. Tamara was great to work with and always kept us up to date with the latest information and expectations.
- None...other than the PD wasn't offered until October when we had started the program in Sept.
- Not a complete list of what was in each kit for the EiE and training was not offered for each module, only one module.
- Not all materials were available right at the beginning of the school year.
- Not sure what is meant by service provider.
- Not very helpful.
- On one occasion I did not receive a response to a question.
- One of our major focuses was the Cyber Defense competition at IT Olympics. We would have liked to have access to the virtual playground sooner. It wasn't that ISU wasn't responsive; it is that they are understaffed for this and almost need a dedicated person. I think they rely on students (good students) but things did not always get done on time. Also, we locally struggled keeping the programming interest for those not interested in the IT Olympics. We have some ideas already for next year and will implement our action plan better. The pre-planning I believe is the key to more success.
- One of the kits I ordered was on backorder, so I had to change my programming schedule. That said, the service provider communicated well and quickly what was happening and were very responsive.
- One of the kits that I ordered was on backorder. That said the service provider was helpful in this process.
- Online activation code procedure was a little convoluted.
- Order the supplies in October. Some were received in December while others were received in February.
- Ordering live materials could be complicated due to the winter months and the weather we experienced.
- Ordering materials was challenging as the process was sometimes confusing and complicated. Communication was tricky via email, and we struggled to ensure that we were completing the process correctly.
- Ordering materials was very difficult. They kept losing all of our paperwork, this was a big headache.
- Originally the person who "helped" us was not very effective, but he is no longer with you; the new help was AWESOME! Very knowledgeable and friendly.
- Our animals for our ecocolumns were dead when they arrived. We had to buy our crickets with our own money. We re-ordered our isopods and they never came.
- Our first box was missing the live order form so that was a bit confusing trying to get a new order form to order the caterpillars for the STEM unit.
- Our group's contact person had some difficulties getting timely responses regarding our supplies, etc.
- Our HyperStream contact was always very helpful and supportive.
- Our list of materials to order from was required to be completed before we took our training. It was difficult to itemize the most important things to order (with limited funding) when I wasn't sure exactly what everything was to be used for. If I could have ordered after the training, I would have been much more prepared to make an educated decision about materials to purchase.
- Our time allotted for science was not adequate enough.
- Prep time / need of cups and materials were above what was anticipated.
- Seemed very delayed getting training.
- Set up and prep time was quite challenging. Storage for Science Experiments on a daily basis is also a challenge.
- She could be hard to get a hold of, and sometimes we received things at the last minute. We prefer being able to plan ahead!
- Since this is different than what I regularly teach, it would be helpful, when we had the workshop, to have one day to work with the hands on materials and one day to go over the instructions in the book to become more familiar with what we are supposed to have the kids do and understand.
- Some of the instructions were a little hard to follow.
- Some of the items were back ordered.
- Some of the light bulbs in my kit were shattered upon arrival at my school. However, the provider graciously sent me replacements in a timely fashion.

- Sometimes felt like a "burden" to them and would be routed to the website for answers, which leads me to believe they may not have known the answers themselves.
- Sometimes if I had a question that I couldn't answer for the students right away, I had to wait till the next day when I heard back.
- Supplemental material was needed to enhance daily discoveries.
- Supportive and professional.
- The amount of emails were repeats, and I started second guessing myself if I filled out surveys. Some surveys I feel I filled out two times and some emails were repeat reminders that hinder educators who do it the first time.
- The balsa wood sticks for the rubber band glider break very easily and there needs to be more in the box.
- The challenge I faced was time to implement this as a cross-curricular tool.
- The challenges were really about the ability to get this program going. Since changes occurred with funding that were outside either of our control it delayed the implementation of the program. That delay limited when we could do various things. That added a bit of stress. However, it all came together and it was a wonderful experience. I feel the provider did an excellent job of connecting us with resources in our community. Our hope is to continue these connections in the future.
- The first time through is always interesting. It goes better after the first time.
- The Iowa FFA Foundation, Josh Remington forgot to order my items for CASE.
- The main challenge was preparing the materials for the lessons. There was a lot of preparation needed to be done before 2nd graders could get started with the materials. It wasn't a major challenge, just something that needed to be done prior to lessons.
- The materials were detailed, and I had to make major changes to my curriculum plans to be able to use the program.
- The only concern was the timing of when the AWIM materials arrived. It was more a stocking issue with the AWIM Company and not a problem with the STEM hub. Some materials were not received until late March/early April which made implementation of the curriculum on a timely basis difficult. Implementation of the final unit/lesson concluded on 6/3/14, four days before the last day of school for students.
- The only issue that we have seen is that the program and reporting are very focused on a traditional classroom setting and our program is an out of classroom setting.
- The order was not complete when received, but when called it was handled politely and the rest of the order was sent immediately.
- The program contact did a fantastic job overall.
- The provider's representative visited my school at two different times. The person checked into the office, left materials or notes, but for some reason did not come to visit with me.
- The staff development of the program could have been better—much of the time was spent reading materials as a group. Very little hands on. The last session, I drove 4 hours for 3 hours' worth of training, that I couldn't use with an after school audience. It would have been better for the second session to have been done online. I would say their biggest strength was giving us plenty of supplies—I didn't have to look for local funds for this. I appreciated that everything was delivered—and we didn't have to pay expenses first—and then get reimbursed by the grant. Much smoother.
- The Technology Association of Iowa (i.e., Tamara Kentworthy) is great to work with. Tamara is thorough in the information she provides, reminds us of what needs to be done and when, and is supportive of helping clubs what they need to be successful.
- The unit took much longer than I anticipated because my class time -45 minutes, instead of 90 minute class periods, which the unit is based on.
- There were no challenges or barriers I faced in working with my service provider.
- There were no challenges or barriers working with the service provider. The Technology Association of Iowa (i.e. Tamara Kentworthy) is great to work with. Tamara is thorough in the information she provides, reminds us of what needs to be done and when, and is supportive of helping clubs what they need to be successful.
- They gave a very informative workshop and provided materials. Great job thanks!
- They were good about emailing, but it would have been nice to have them stop in more than one time.
- They were very quick to answer any questions that I had. They responded very quickly to all of my e-mails. I have also called the Carolina several times and their customer service was outstanding. They exceeded my expectations.
- This was a class I had planned to start on the first day of school, but I did not receive training until October.
- Time commitment. (2 responses)
- To buy extra textbooks was very expensive. Our classroom sets through Carolina were only 16 for a class!
- Wanted to start the year with the unit and some materials didn't arrive until November. That's half a school year gone.
- Wards Science backordered a lot of the items.
- We did not have our kit when we had our training. When we ordered live animals, they often died due to weather and one time did not arrive at all.
- We did not work with a service provider.
- We didn't get a second day of PD scheduled that made sense for me to travel to.
- We didn't have enough materials and a few informational items/concerns were not addressed (2 responses).
- We ended up getting 4 Carolina Curriculum kits: My Senses, Earth Materials, Patterns All Around, Push-Pull-Go. We had some confusion about which ones we ordered and ended up getting an animal one instead of the Earth Materials one. We sent this one back and got what we wanted no problem. We then received a refurbishing kit for the Animal one rather than the Earth Materials. . . Other than this, everything has been outstanding and we really enjoy the kits!!!
- We had a very difficult time getting our materials for the class.
- We had an initial startup meeting, I thought there might have been some follow up, or progress monitoring on how things were going.
- We just did not receive the info about the surveys. We did check with Mitch and he was able to get everything to us.
- We need more time for science in our day. I had to short several lessons to finish in the time our schedules allotted.
- We only received one of the Robotics kits and I had to request the second one. The Cyberdefense playground wasn't available until after January 1, very disappointing. We had trouble installing some of the software and never did get assistance in resolving this. Was expecting lesson plans, but received nothing. I really felt we were on our own with this program and really could use additional assistance. We never did receive a mentor.
- We ordered materials at training and did not receive materials for 4 months.

- We received limited training, and had no exposure to training since the initial.
- We received our materials late from Carolina Curriculum.
- We received one day of training. The timing of the training was before teachers had time to familiarize themselves with materials. The training was very general and not specific to my kits.
- We struggled with getting the software needed for A&R and DM courses onto our school computers. I don't know if this was our IT error or if it was a software error.
- We thought that there was supposed to have been a 4th kit sent.
- We were never matched with a mentor.
- We were pretty slow getting started, and I still feel pretty overwhelmed. David S. from Logan came and talked with me about robotics and I did a web thing with a gentleman who gave me some thoughts about Alice, but it would be really nice to have someone who could spend time working with the kids, since I don't even understand their frustrations, let alone have much help for them.
- We were told that the materials would arrive between 2 weeks and 1 month after the training session, but they arrived 7- 12 weeks after the training session was scheduled.
- We wish we would have had the kindergarten kit during our few hours of in-service time with the Stem kit.
- We would like to have the option to purchase re-fill kits based on activity, instead of purchasing the whole kit at full cost. We had items for 24 youth, but had 47 sign up for a session.
- When I ordered live materials, the order did not completely process and the delivery date was one week later than I was told it would be. Everyone I spoke with was very helpful and quickly corrected the mistake.
- With PLTW assistance at the beginning of the year, the wait time was long.
- Would have liked to have the kindergarten kit during the service day. We did not get to learn about and work with materials for our grade level.

Collaboration with groups during the implementation of Scale-Up programs

In-School

- 1st grade teachers
- 2nd grade classroom teachers.
- 2nd grade team. (2 responses)
- 3rd & 5th grade teams, Gifted and Talented district team. (Expanded Learning Program - ELP - teachers)
- 3rd grade science teacher help and observer/ also picture taker.
- 3rd grade team
- 4th grade teacher who had done it before.
- 4th grade teacher who was using the same Carolina program.
- 5th grade teacher
- 5-8 science teachers
- 5th grade teacher
- 5th Grade team (2 responses)
- 5th grade team of 9 teachers
- 6th grade students
- 7th and 8th grade Science Teacher and 3rd Grade Teacher who also implemented the Scale-Up program.
- 8th grade science teacher who is also implementing a STEM unit.
- 8th Grade Students
- 8th grade students, Talented and Gifted Teacher
- 8th grade teachers
- Administration (7 responses)
- Administration and neighboring PLTW schools
- Administration, CTE teachers, science teachers, PALS students
- Administration, teachers, students, FIRSTTech robotics group
- After School Program
- Ag Science Class
- All grade 7 and 8 teachers
- All marketing for this program was done through the school
- Another Science Teacher who is also in 3rd grade
- Another second grade classroom
- Aplington-Parkersburg, Dike-New Hartford, Gladbrook-Reinbeck, and Grundy Center Schools
- Atlantic Community Schools, Griswold Community Schools, CAM Community Schools
- Belle Plaine Community School District - Administration Team
- Biology Department
- Biology instructor
- Biology, Chemistry, Math
- Biology, Science, Math, Reading departments as well as Administration (principal and school board)
- Careers Department
- Cedar Valley West Science Team
- Cindy Bedford
- Classes
- Classroom teachers
- Collaborating teacher
- Collaboration with all grade 8 science teachers
- Colleagues
- Computer science teacher/other 8th grade educators
- Cyber Security was integrated into the class
- Davis County schools
- DECA organization
- Did some team teaching
- Directly with schools to use their buildings and facilities
- During their Comet-Time (homeroom for 15 min)
- Elementary Educators, Science Program
- Elementary grade teachers
- Elementary Talented and Gifted Students. 3rd-5th grade
- Extended Learning Program
- Fellow grant recipients within my district
- Fellow teachers with Carolina STEM grants- discussed kits and format of teacher's guide for own implementation.
- FFA
- First grade teachers (2 responses)
- First Grade Team
- Fourth grade team
- FTC robotics coaches
- Future Business Leaders of America
- Gen Ed/Special Ed
- Grade level teacher (2 responses)
- grade level teaching partner
- Grade level team (8 responses)
- Grandma volunteer, grade level collaboration groups including title I and English as a 2nd language, colleagues at other grade levels, Head Science Teacher.
- GTT Teachers (Jackie Leonard and Michele Hemming)
- Head of Computer Technology Support (Has done a lot of work with PLTW at the district he was at before.)
- Help in a school with great student information support and teaching aids made available to us.
- High level Math students
- High School Science
- High School Science Teachers
- High school STEM instructor and Middle School STEM instructor
- Home School Assistance Program staff members in Ames Iowa
- Homeschool
- Homeschool Assistance Program in Muscatine Community School District
- HyperStream technology program
- I collaborated with another 2nd grade teacher as well as 1st and 4th grade teachers to discuss strategies that worked well as well as those that didn't.
- I collaborated with another teacher that gives resource support
- I collaborated with our science and math instructors in implementing the program.
- I visited with our 5th-6th grade Science teacher (Diane Moritz) about things we were doing.
- I was truly on my own!
- I went into the 4th grade science class to implement the program.

- I worked with our technology teacher to show me how to use Google Docs and helped me teach students Scratch.
- Industrial Tech Teacher, TA, and Administration, Tech. Engineer
- Industrial Technology Teacher, Math Teacher, Science and Math Department Advisory Team, Corning Community School Board
- Instructional Strategist & other Science Teachers
- Johnston Community Schools
- Journalism Department
- Just my 2nd grade class did our kit
- Kindergarten team teachers
- Kindergarten through 5th grade teachers
- Kindergarten, first and third grade teachers, principal
- Language, social studies, reading
- Lemme Elementary School Students 3rd-6th grades
- Librarian
- Like grade and content partners (2 responses)
- Linn-Mar High School Environmental Science class
- Many of the grades watched us work and test our Jey Toys and Gliders
- Marion High School PLTW teachers
- Marketing to all schools in county
- MCHS health classes
- Middle School Science, Administration
- Miller Middle School provided the facility for us to use
- My administrator and custodians really collaborated with me about the setup aspect of the program.
- My co teacher and the volunteers that came in to help. I also benefited from the support given by the Carolina Representatives.
- My colleagues in 6th grade
- My First Grade Team
- My kindergarten team of teachers, elementary principal
- My partner teachers within my grade level and lower-grade partner teachers who we shared our learning with.
- My third grade team of 4 teachers, the resource teacher, Title 1 teacher, elementary principal, superintendent, middle school science teachers, art teacher; talented and gifted teacher.
- Nashua Plainfield Science teachers
- Nevada Community School District Administration
- None (2 responses)
- Offered workshops for middle school students
- Other 1st grade teacher
- Other 2nd grade teachers
- Other 3 third grade teachers
- Other 3rd grade teacher and the rest of the elementary teachers and principal.
- Other 4th grade teachers
- Other 5th grade teachers (2 responses)
- Other 7th grade science teachers
- Other 7th grade teachers from across the district and head teachers.
- Other 8th grade teacher, also with 6th and 7th grade teachers
- Other co-operating teacher communication about how things were going.
- Other first grade teachers (2 responses)
- Other grade level teachers, principal
- Other grade levels in the building
- Other K teachers at my school
- Other Kindergarten classroom, Special Education aide and ESL program
- Other Kindergarten Classrooms
- Other PLTW teachers
- Other science teachers (4 responses)
- Other second grade teachers (2 responses)
- Other staff members
- Other students/faculty
- Other teachers (7 responses)
- Other teachers in the building (2 responses)
- Other teachers in the district
- Other teachers, administration
- Other teachers, as well as administrators
- Other teachers, curriculum director
- Other Teachers/Administrators (2 responses)
- Other third grade classes, the art/TAG teacher
- Ottumwa Community School
- Our IT people tried to help me out with getting the programs downloaded, Tamara set me up with some people who are familiar with ALICE, David S. helped me get started with Robotics, we were pretty much on our own for Multi-Media and Web designing because that class was the first 6 weeks of school and Hyperstream wasn't really set up yet.
- Our school's second grade class
- Our week long camp was held in the school library and co-taught by two science teachers. Washington Community School District.
- PE and math
- Peer teacher collaboration
- PLTW high school teachers
- Principal, Technology Coordinator
- Rachel Binneboese - Administrator, Jake Sheets - technology coordinator, Roger Peterson - co-worker
- Robotics Class
- Robotics Group
- Robotics instructor
- School employee
- School personnel at both Schuler Elementary and Atlantic Middle School
- Science
- Science Class
- Science Department (6 responses)
- Science teacher (6 responses)
- Science we pooled resources and equipment
- Science, Technology, Engineering and Math Club, some Professional Development
- Seymour FFA chapter
- Shared this with the Math teacher and we discussed how to use this team-teaching a STEM class next year.
- Some classes released the early butterflies in our greenhouse that the high school has.
- Special education
- Special Education Teacher
- Special education teacher, industrial technology teacher
- Spencer School Systems

- Sports programs, school administration, and technology department
- Statistics teachers and students, Biotechnology Students and Teachers, Administrators, TAG and Special Education Teachers
- STEM Club
- STEM Leader and 3rd grade team
- STEM teacher
- Student to student
- Study hall teachers
- Talented and Gifted
- Talented and gifted population, students in study halls, and students who expressed an interest in STEM
- Talented and Gifted students and building staff
- Talked ideas over with other the other kindergarten teacher.
- Teacher collaboration, Carolina educational liaison
- Teacher teams
- Teacher- that does PLTW in high school
- Teachers (2 responses)
- Teachers on the fifth grade team
- Teaching partners (3 responses)
- Technology coordinator, Teaching team, media specialist, principal, other grade level science teachers
- Technology coordinator, tech assistant and programming teacher
- Technology department
- Technology Education Department (2 responses)
- Technology staff to make sure we could receive Alice and LEGO Mindstorm on the students' computers.
- The other 1st grade teacher and the principal
- The other 2 4th grade teachers in my building
- The other 2nd grade teacher and class in our building - Mitchell Karnes
- The other 3rd grade teacher and the school principal were useful
- The other 4th grade science teacher
- The other 5th grade science teacher
- The other 6th grade teachers and the administration team (2 responses)
- The other 6th grade teachers of Math and ELA
- The other educators who were implementing this kit or other similar kits.
- The other first grade teacher and I collaborated.
- The other kindergarten teacher
- The other kindergarten class room/ special ed. aide, ESL program
- The other kindergarten classroom
- The other preschool class
- The other Science teacher
- The other Science teachers in my building.
- The other second grade classroom in my building.
- The science department
- The sixth grade language arts department.
- The teachers who work for the after school program.
- This was an after school program for gifted 4th through 6th graders.
- Training at another school
- Tried to modify to fit our SWH approach in science.
- Two other teachers in the program with me.
- Used for school enrichment in an elementary class.
- Valley High School
- We follow the Science Writing Heuristic Model and adapted curriculum to meet these standards.
- We had before school, after school, and study hall times for students. They also came during Channel 1 and during seminar.
- We joined another school for a professional development session to learn more about how to implement STEM into our classrooms.
- We spent time showing other classes our work, especially in Automation and Robotics. Students enjoyed seeing the cars that we built.
- With other 8th grade science teacher (2 responses)
- Worked with our talented and gifted teacher and my co-teacher.
- Working with the high school science teacher to gather lab equipment and supplies that were needed, but not provided in the Carolina kit.

Out-of-School

- 4-H Programs (8 responses)
- Adel-Desoto-Minburn school district, Perry Child Development Center
- Advisory Board (2 responses)
- Alcoa
- Alumni students
- Anchor activities
- Area Education Agency training and the trainers provided by Carolina Biological
- Berkley Technology Mentors (field trip to business, Skype Sessions, IT-Expo at Iowa State, Digigirlz sign up but snowed out.
- Berkley Technology Services, Winterset Madisonian (Amy Christiansen), The School Newspaper
- Blank Park Zoo
- Businesses
- Carolina instructors, our AEA (Area Education Agency)
- Carolina STEM reps (2 response)
- Carolina teacher workshop
- Clarke Elementary allowed us to use the facilities at no cost right after school.
- Classmates from my training on Facebook
- County 4-H Programs
- Deb Karwal - Anderson Conservationist
- Des Moines University medical college/professors and students
- Discussed Hyperstream with educator from Heartland Christian
- District 8th grade teachers
- District Bookkeeper for the grant paperwork
- District-wide in-service training
- DNR
- Each KC site supervisor discussed activities/suggestions/results with other site supervisors.
- EiE at National Science Teachers Conference
- Engineer living in Lawton
- First Lego League
- Home-school students
- I collaborated with colleagues out of my district that attended the PLTW training....we used social media such as Facebook, Twitter, etc.
- IAAE, Iowa FFA Foundation
- Indian Hills Community College
- Iowa Central Community College
- Iowa FFA Foundation (2 responses)
- Iowa State (4 responses)
- Iowa Western
- ISU Extension & Outreach
- ISU programs (science & math).
- John Deere and IBM
- Kids Club (2 reponses)
- Kim Weise, our Greenhills Science consultant.
- Local manufacturing company engineers and employees
- Local recreation center
- Louisa County Conservation Board at the Big Sand Mound with Monsanto and Mid-American Energy.
- Luther College
- Mad Scientist 4-H Club, 2014 Region 1 Extension 4-H Summer Educator, Ben Pullen, Iowa State University Extension and Outreach STEM Intern, Nathan Sexe
- Mentors
- Meteorology student from Iowa State University who may speak to the class about meteorology in May if his schedule permits
- Mike Coltom - PLTW, Susan Lyons – PLTW
- Multicultural Family Center
- Nevada Journal, Ames Tribune, Nevada Public Library
- Nishna Valley Family YMCA and 4-H
- Nishnabotna Valley YMCA
- North Central STEM hub out of ISU
- Northwest AEA-Jordan Menning with KidWind Challenge
- NRCS - Natural Resources Conservation Service
- NRCS and DNR
- NW AEA (2 responses)
- NW Regional STEM Hub, Northwest AEA, Prairie Lakes AEA
- Other Ag Teachers (2 responses)
- Other agricultural education teacher friends teaching the same CASE – AS
- Other agriculture education teachers (3 responses)
- Other class members
- Other district representatives from Davenport and Cedar Rapids schools
- Other high school agriculture programs
- Other Science teachers in the district (4 responses)
- Our afterschool program, "Husky Adventures"
- Parent volunteers (4 responses)
- Past graduates from my programs who came back to help their friends on weekends and on breaks.
- PlayWorld
- PLTW personnel
- Professional development with Carolina-STEM representatives and other grade level instructors.
- Retired tech coordinator and public school
- Robotics was after school program
- Rosemary Peck our AEA Science Consultant
- Spent about a half hour on the phone with the service provider teaching me how to navigate the website. Went to a neighboring school PD to learn more about the website.
- Telligen
- The Science teachers and an associate from our building.
- This program was used to generate a week long day camp for Iowa State Extension.
- Training in Iowa City before implementation process.
- Vermier Specialist
- Visionary Services, Inc.
- Visited the American Gothic House and helped to plant trees and maintain the flower beds around the property.
- We called the school insurance company to see if we could go for a plane ride.
- With 2 4-H Clover Kids programs - for youth in kindergarten through 3rd grade

Community

- 4-H County Youth Council; City of Rock Valley; Orange City Public Library; Sioux Center Public Library; Hospers Public Library; Citizen State Bank, Boyden; Hawarden Public Library; Hull American Reformed Church (3 responses)
- A class from Northwestern College and their professor
- Adel Public Library
- Alcoa
- Blank Park Zoo
- Boone Hardware and Local Ford Dealership
- Boone/United FFA Alumni, Boone Area Chamber of Commerce
- Businesses in the community that are very science-based (2)
- City of Fort Dodge
- City of Sioux Center and Sioux County Fair Board
- Community Demonstration
- Community member to present the importance of technology in the classroom
- Construction of a greenhouse facility
- Country Haven Residential Care Facility, Graham's Auto Dealership
- County Conservation / Naturalist
- David Vogel Pioneer Warehouse, Precision Soya
- Engineers and business community members for classroom facilitators and individuals listening to the student team presentations
- Engineers (2 responses) and local businesses
- Expert volunteers: one Iowa State Univ. engineering professor, one private industry engineer
- EZ Way Inc. field trip
- Farmers Cooperative, local farmer
- FBL Financial provided several mentors to
- Fisher Controls/Emerson provided ambassadors who taught throughout the year.
- Grundy County Memorial Hospital, Unity Point Lifeguard.
- Harrison County GIS Manager, County Emergency Management Coordinator, Loess Hills State Forester, Little Sioux Scout Ranch Staff
- Hy-Vee mentors
- I have been collaborating with resources in my area to set up field trips that would extend our learning!
- I promoted and described case to parents and friends of the FFA program I got supplies from them as donations.
- IBM, John Deere
- Industry volunteer (2 responses)
- Iowa Department of Natural Resources
- Iowa Lakes Community College instructors
- ISU Extension and 4-H
- John Deere Engineer- Mike Brand
- Johnson County Neighborhood Center Lemme Breckenridge After School Program
- Kendra - Iowa State Ext Office
- Local agriculture businesses
- Local businesses for lab materials and lab enhancements by guest speaking
- Local Businesses, Pioneer, Peterson Contractors, Crop Protection Specialists, Heartland Coop
- Local Veterinarian
- Looked into Rosenboom Cylinders being a partner
- Manager of Southwest Regional Water, he was our sponsor for our AWIM project and we continued to use him as a resource in the project.
- Manager of Southwest Regional Water, KMA radio
- Mercy Medical Center
- Midwest Industries Inc. (Shorelander Boat Trailers/Lifts)--will be visiting the plant the last week of school
- Mt. Pleasant Town Hall meeting
- Networked with social networking sites to help us improve our skills and a lady from The Winterset Citizen-Julie.
- Nevada Community Resource Center
- Nishna Valley YMCA, Cass County Conservation
- Northwestern College in Orange City Iowa
- Other teachers using CASE curriculum
- Our community based STEM program
- Parent Information Letters
- Parents
- Past Lego League Leaders
- Pinter's Landscaping
- Polaris Industries
- Posted and shared our note booking and our standards and benchmarks we were able to meet with this program
- Principal Financial Group (2 responses)
- North Iowa Area Community College
- Professionals in Agriculture Businesses and Universities
- Project Lead The Way committee, made up of members of manufacturing and businesses in the area.
- Provided plants to sale in the Fall and Spring
- PTO, local businesses (2 responses)
- Public library (3 responses): Jesup Public Library, Villisca Public Library , The Dr. Grace O'Doane Alden Public Library hosted
- Putnum Museum in Davenport, IA (STEM Field Trip)
- Rebel FFA Alumni
- Ruffalo Cody
- School board members, AEA science contacts
- School foundation
- Science Center, Cedar Rapids, IA, In the process of working with U of I College of Engineering
- Soil Conservation Service
- Spencer Chamber of Commerce Ag Committee
- STEM Advisory Council
- Telligen, Carlisle Citizen
- The Rockwell volunteer
- University of Dubuque, Davenport West High School, University of Northern Iowa, Grout Museum, Bickle's Cycling and Fitness, Putnam Museum, John Deere
- University of Iowa College of Engineering
- We called on parents, grandparents, siblings to help us build our multi-media community.
- We have a community partner that came to speak to students twice this year. He's a contractor and showed the students how he uses STEM skills in his work every day.
- We hosted the professional development session in our school and invited the surrounding schools to attend

Volunteer

- 4-H leaders
- 4-H youth and parent
- 5 volunteers from John Deere
- A college professor from a neighboring private college
- Alcoa
- ALCOA engineers
- Asked for parents or grandparents to help, and 4-H members
- Buena Vista University student
- Bunn-o-Matic gave volunteer time off for one of my parents to help chaperon
- Business partner volunteers.
- College student (engineering major)
- County 4-H volunteers
- Donny Cerwick - Civil Eng
- Dordt College Lab Systems Engineer, Dordt College students (2 responses)
- Dr. David Van Horn brought in various technology and our skype sessions with Berkley Technology Services were excellent
- Dr. David VanHorn and Mrs. Karin VanWerth
- Electrical engineer from Pearsons
- Emergency Mgmt Services in Butler and Grundy County
- Engineer
- Engineer from a local industrial plant
- Expert volunteers from the community came in to help us with the implementation!
- FFA Alumni
- Grandma volunteer, big brothers/sisters volunteer. Every child reads volunteers.
- Guest speaker who is originally from the area but now an aerospace engineer working in Seattle.
- Guest speakers from technology companies
- Guidance counselor at the ADM School was my partner in delivering programming.
- Helped students complete the investigations
- I had a geologist come in and speak with my classes.
- I had a limited amount of time with my volunteer. I would have loved to have him in my classroom often, but his job doesn't allow him the opportunity to do that.
- I had two young female engineers from Alcoa come and speak with the students.
- I only was able to get parent volunteers to help.
- Individuals from the community
- Jon Devitt (Vice President of Engineering at Midwest Industries)
- Lab Systems Engineer from Dordt College, Northwestern College students
- Local Master gardeners
- Marketing manager
- Mary Cooper provided knowledge and information on propagation.
- Mason City Fire and ambulance service.
- Mentor from Rockwell
- Mentors from John Deere ISG
- Mike Post, Ruth Post, Dr. Jonathon Grossmann.
- Mr. & Mrs. Dammon
- My high school volunteers (which were former Science Club members)
- My volunteer came and helped with the Engineering with Nature part
- None
- One parent volunteer
- Our main mentor was a teacher at Northwestern College
- Parent volunteer (4 responses)
- Parent volunteer, Dee (2 responses)
- Parent with STEM based job
- Parents (4 responses)
- Parents in technology/engineering fields
- PCE engineer
- Recruited Parents of the Youth participants
- Rising Stars Iowa State University Interns with ISUEO, ISUEO Summer Ag and Natural Resource Intern, 4-H County Youth Council
- School library
- Scott Frank
- Steve McAndrews (Works for NSK in Clarinda, Iowa)
- Student teachers
- Three volunteers helped each month to provide the program.
- Used parent volunteers with real live experience in the area.
- We had a dad who was also a pilot come to our room to help and speak.
- We have a community partner that came to speak to our students twice this year. He's a contractor and showed the students how he uses STEM skills in his work. He was a great real world example for our students.
- We have had 3 different engineers come to talk to our students about their type of engineering.

Other

- 5th Grade Team
- 8th grade science teachers in our district and our head teacher.
- Business
- Businesses they were mentors
- CASE Natural Resources and Ecology Field Test Institute cohort group of teachers that were trained with me.
- Central College - science practicum student taught a portion of the lessons in the unit.
- Displays at conferences
- District 8th grade science teachers and Head Science teacher
- Dordt College Science Departments
- Home School Assistance Program teachers
- I didn't collaborate with any groups.
- I had one high school student who was able to help about half of the time.
- I meshed it with my Science Writing Heuristic training.
- I used another teacher in another district that had already implemented the program for suggestions and ideas.
- Jim Black an engineer
- K-12 Administrators
- Kristine Bullock SE Hub manager (Town Hall Meeting at Mt. Pleasant Middle School)
- Mickelson ExxonMobil Teachers Academy
- My class released our butterflies in the FFA greenhouse due to temperature when we needed to release them.
- N/A-something we'd like to initiate moving forward
- NAAE Collaboration group for CASE AFNR Group
- North Iowa community college
- None (3 responses)
- Our district head teacher and the other two middle school 8th grade science teachers.
- Our feeder middle school science
- Our training group
- PLTW helpers
- Pretty much on my own
- School Board
- Social media such as twitter, Facebook and the LMS
- Student helpers
- Tamara Kenworthy was a huge resource.
- Technology Association of Iowa
- The Keystone AEA- Jason Martin-Hiner
- Tina Habeger - special education para educator
- Virtual visit from godaddy.com.
- We also included the superintendent and principal in implementing our STEM program.
- Well planned field trips extended our learning.
- When we met in Cherokee for our first meeting, I planned my unit at the same time as another teacher implementing Ecosystems. This made me feel more at ease over possible concerns.

Challenges and barriers faced in implementing the Scale-Up Program

- The amount of time to prepare the lessons was overwhelming. I felt that on the training day we should have been able to experiment with our own grade level kit. We did not have enough materials to address the amount of students.
- A couple of equipment and design issues: Transformer housings came apart from the circuit inside when students pulled them from electrical outlets. 3-volt transformers don't provide enough energy to power larger drive gears. Large drive gears to smaller driven gears are important to speed designs.
- A good problem: the supplies where voluminous and over flowing - it will take the summer for me to sort some of it out and get ready for next year - A GOOD "Problem", The only "bad" problem was the online textbook is not super easy to use - the kids could not figure out how to increase the font size too small to read as is.
- A little more teacher-directed than we prefer.
- A lot of prep time, some lessons took too long some were too short.
- Administration changes make it difficult to keep the pace and get ball rolling for the first year's success.
- Allowing consistent time in scheduling that allowed extended engagement to complete activities.
- As a first year teacher, not having connections throughout the start of the school year made implementing the program tough.
- As I mentioned earlier, the weather caused a delay in implementation. I was not able to connect with Rockwell Collins to have engineers come in like I had planned, but will get that accomplished when I teach this unit next year.
- As I told earlier, I had to change my plan to meet grant deadlines and curriculum as my Regional area chose not to support the Camp in a Can Curriculum.
- As mentioned before, equipment & supply issues were a problem. Also, I got bogged down in checking journals. I think I would have to do something different with that.
- As mentioned earlier in another question, I did not receive the kit and materials until middle to end of November. There were vacation breaks, as well as weather related issues, (early outs or no school due to snow). The room is quite cool during the winter months so living organisms do not do well.
- As mentioned earlier, we had some issues getting girls interested in the programs we had originally designed to implement A World in Motion. We had to redesign some other programs to include AWIM materials but once girls became involved in the activities, they really had a good time and benefitted from the program.
- As mentioned previously, I thought the Straw Rocket category was too advanced for my K-4th grade students...mostly kdgs.-2nd grade. I put quite a bit of time coming up with examples, vocabulary definitions that the kids could relate to. The program did not provide enough differing activities for lower level elementary kids. We shot rockets through straws for seven sessions...they became bored easily. After completing book directions, I made up some own rocket activities to try and demonstrate what the objective of the daily was. IDENTIFY THE MEASUREMENT OF THE STRAWS TO THAT STRAW COLOR FOR EASY RECOGNITION.
- As noted I took over the program when the original leader went on maternity leave. I did not go through any of the training prior to implementing the program. Had I been part of the planning and training phases things may have made more sense and been easier to implement.
- As with any after-school club, we are competing with other activities. Sometimes students had to either divide their time or choose between 2 activities.
- As with most projects, money can be an issue. The STEM grant greatly helped with purchasing the necessary equipment to implement that CASE Curriculum, but there will still supplies that I could have purchased had there been more money available.
- At times, I felt some of the activities were repetitive and not needed. I also felt that moon phases in kindergarten was a little above their abilities. I did some modifications and made if more meaningful to them.
- Audio CD was too fast for 2nd grades to follow.
- Barriers that I have had are student's attitudes about the expectations that I set for this class. This was my first year at Cardinal teaching Agriculture. My expectations were very high for this class. Students in the past had not had very high expectations and struggled with handing labs in and doing some of the activities.
- Because of the late arrival of the materials from AWIM, I felt rushed by the time the 3rd grade materials arrived and wasn't able to give ample amount of time to the implementation of those lessons. While every component was completed by the third grade students, the "think time" I fear was cut short.
- Because of the vast range of age/maturity/ability in my group, it was hard to keep everyone engaged. If we simplified everything, the older kids were really bored. The pictures in the manual were pretty unclear.
- Because we offer out-of-school learning and not a formal school setting, it is a challenge to create opportunities for intense, long-term learning. By using the AWIM kits in STEM day camps, we hope to create a venue where that learning can happen. AWIM was introduced to a number of college students and businesses. We need to build relationships with individuals within those settings to build new partnerships with individuals and businesses. It is always a challenge to have enough time to become confident in leading new activities.
- Being a new curriculum, I was nervous to implement it in my classroom. However, by doing each lesson ahead of time in preparation, my class lessons went really well!

- By using the AWIM curriculum as a Talented and Gifted activity, many of the challenges did not deal with the scale-up program, rather with the schedule provided for my TAG classes. In my district, TAG meets weekly, which making working through curriculum difficult. One change in schedule and missed class and you are a week off in the curriculum sequence.
- CASE is an intense curriculum and is difficult to complete all of its parts in one year. I completed a large portion of it during the school year.
- Challenges were minimal, like with any new curriculum it took more time for planning as I was introducing activities that I have not yet done in class before. However, the quality of the curriculum exceeded what was being used prior to CASE.
- Change in subject matter.
- Children seem to want to Go-Go-Go, before they have comprehended... redirecting them at times was necessary, but certainly not a problem.
- Class size.
- Computer issues at the beginning but that all got worked out quickly by our fantastic tech guy!
- Constructing the terrariums.
- Cost to order more textbooks.
- Could have used more instruction at first with the option of more times to choose from.
- Creating structured worksheets and record sheets to facilitate third grade learners in place of lined notebook paper.
- Damaged equipment and missing washers.
- Damaged equipment, late arrival of materials, paperwork lost by company.
- Detailed materials.
- Did not get the materials in time.
- Didn't think curriculum was great. Needed more background information. Would like some worksheets that went along with material and some assessments.
- Due to several school snow days our schedule was continually being shifted back (later in the year). This pushed me into April prior to starting the materials.
- Enough materials for all students and materials that were durable.
- Equipment needs.
- Finding a no school day that works with a variety of districts.
- Finding a time for students to meet that was consistent.
- Finding a time when students were available to get together outside of school with sports and other things happening.
- Finding mentors and common times for students to work together.
- Finding some of the materials that were not included in the kit, but they were required for the experiments.
- Finding the time to do this.
- Finding the time to get everything done.
- Finding the time to implement the program was the most difficult.
- Found that some of the activities were challenging for the younger kids.
- Fuel cells don't always work as planned. Some fuel cells work better than others causing extra challenges for some students.
- Funding could only be used to pay directly to EIE, therefore I had to spend my own money on notebooks for students and other miscellaneous materials needed for the units I taught.
- Funding for additional equipment.
- Gathering the supplies needed, but not provided in the Carolina Experimenting with Mixtures, Compounds, and Elements unit. The Carolina Teacher's Guide was fairly good, but some of the directions for the teacher could have been more clear and concise.
- Getting high school students involved. Finding times to practice as a team because there wasn't one day a week that all students could make it. As a result, every week was different.
- Getting staff to take the time to understand and try the program.
- Getting started was relatively easy, and getting the kids to show an interest in the projects was also fairly easy.
- Getting students really involved. We had about 10-12 start with the program and ended with about 6.
- Getting the needed equipment on time. Our district ordered a new mobile laptop lab for implementation. It did not arrive until after the first month of the school year. So the first month we did STEM wind energy and it worked out very well. Not knowing whether the contact person is getting us signed up for the upcoming year. Finding community partners in a small rural area.
- Getting through all the material in the allotted time was challenging. We were unable to get any guests from the community to come in.
- Getting volunteers to participate.
- Had a difficult time finding a place to store equipment and supplies. I ended up building shelving and storage areas for all supplies.
- Have very big classes this year.
- I am not sure where the communication gap was, but I did not get my materials to my classroom until October. This year we had a lot of implementations so it was overwhelming trying to read up and quickly order the items that did not come with the kit. I also was never told about the training so I was doing it all on my own! Great kit but too overwhelming for an elementary teacher who teaches Spelling, Vocabulary, Reading (both large group and guided), English, Math and Science. I also did not have the needed teaching time available for the prep time it took me daily.
- I believe the biggest barrier is the lack of materials that are volunteer friendly to use in after school/out of school time programming.

- I did not experience any challenges or barriers.
- I did not have any barriers.
- I didn't face any challenges. The site was a great resource to use.
- I didn't have any problems implementing the program.
- I don't consider myself a scientist, so I was challenged as I approached this resource to develop my class. I knew my students (gr 5-6) would present with greatly varied backgrounds and knowledge.
- I don't see any challenges at this time.
- I felt overwhelmed with the program and didn't know what parts should/could be eliminated and what parts had to be completed. There were too many parts each lesson and not enough time to complete all of it. If this was the only program that I was doing all year, it would be fine but in order to meet the Iowa Core standards I could only teach this program for 4-6 weeks.
- I felt that some lessons were stronger than others.
- I felt that the proposed pacing guide was unrealistic. When only 16 textbooks are provided, it is difficult to assign reading outside of class. With a class of 155 students, making multiple copies of the articles is not eco-friendly or cost effective. I just learned TODAY that I had access to e-books with this grant... My student population is 70% "minority" - obviously some with limited English skills. I really needed to adapt the lessons to accommodate vocabulary acquisition and comprehension of the concepts.
- I felt the program was too teacher-directed.
- I felt the students don't have enough prior knowledge to just use the curriculum as is. I will pre teach next year before I use the program.
- I found the suggested pacing to be too fast. The unit took us about 4-6 weeks extra. Even then, students said they felt rushed. Also, I felt that there was not sufficient practice with certain concepts. For example, in my unit students read a passage about the cell organelles and functions. That was the only exposure they were given to many of the cell parts. They needed more practice with that content to have an understanding of it. Students also complained of being tired of using the microscopes by the time we were done.
- I had a hard time implementing all of the activities and still having time for questioning and discussion.
- I had no challenges or barriers for the most part.
- I had the snails die quickly!!!!!
- I had to condense the material quite a bit to make it usable in the afterschool setting. This was fairly straightforward to accomplish with the AWIM material.
- I had to condense the material quite a bit to make it viable for a monthly after school setting. This was fairly simple to accomplish.
- I had to spend extra time assembling parts of the kits/unit materials before I could use them. For example, there was some assembly time involved in making the planets/soda can models of the planets varying masses.
- I have my own section of third graders but I wanted all third graders in our building to have an opportunity to participate so it was difficult to fit it into our schedule for all of us and also difficult to figure out what to do with my students while I was working with the other groups of students.
- I have not completed the unit as of date. This survey needs to be given at the end of May or the beginning of June.
- I loved the materials once they arrived.
- I needed to do some conversions to accommodate high school level students.
- I only meet with my students once a week, so implementing a 15-20 day curriculum was challenging because it occurred over 15-20 weeks.
- I really did not find any challenges.
- I really just went right into it. I have had no barriers or challenges. It has really been wonderful!
- I really struggled with the technology issue as well as we did not really have a lab setup that allows for collaboration. Also, we have limited amount of work space and therefore it was difficult to find space to store students' projects because the only room that we really had to work was also my science classroom.
- I received only one complete kit in the World in Motion set. I collected supplies for the other parts of this kit and used the handouts I had received in the training to implement the other lessons in this Scale-Up program. I shortened the time frame of the programs to fit with the time we had with the participants and to stay with our monthly schedule.
- I saw 51 students and received 16 textbooks. Parents often expect a textbook to be able to be taken home, and this was not an option. I do not have sinks or lab space in my classroom. I also do not have space to store the extensive materials.
- I struggled to sustain student interest in an academic project as we are an afterschool program.
- I think I would have liked to set it up myself or coordinate with businesses myself- eliminating the middle person.
- I think my biggest challenge is just getting used to teaching new curriculum. I have never taught automation and robotics before so it has been a challenge at times but has gone pretty smooth.
- I think the two largest challenges were the time for each lesson (45 minutes) and storing the materials and replacement kits. Our school schedule has special education students pulled in the afternoon, so this meant that I needed to work with the Special Education teacher to ensure the students were present for the Labs.
- I truly started feeling rushed to get the Scale-Up program completed, so I shortened each kit I received to roughly 3 weeks which each kit's booklet stated was an acceptable amount of time, though I would have liked to take it a little further.
- I truly, truly wish I had had the opportunity for more training, prior to implementing Defined STEM. The training I DID attend was great! I also participated in a webinar, but I still wish I had had more training.
- I was fortunate to belong to a Facebook group from my class who helped me a lot.

- I was going through chemotherapy and was unable to teach some weeks. I wanted to do the STEM project myself, so it became a bit disjointed. I am late in getting it completed and getting my information to you, but we will be completing it next week.
- I was implementing this program for 4 sections of third grade in addition to our regular science curriculum. It was sometimes difficult to find a time to work this into our schedule but when we made it work it was well worth it.
- I was not able to implement due to the fact the materials weren't received until after Christmas and as late as last week. I ordered all materials in October and didn't receive the first kits until the second week of January. Some materials came in February, part of the order was lost and needed to be reordered, and some materials were delivered last week. I have material that needs to be covered and felt like I was waiting too long for the STEM kits to arrive.
- I was ready to go in September but the professional development and curriculum weren't available yet. We have other EiE's so was able to use the prep lesson that is common throughout, but would of liked to have had the PD and curriculum earlier for better preparation. I used with a homeschool group, so assessing current core/science concepts were unknown and do think some students struggled because were not on same page.
- I was very disappointed to learn that I could only use my grant money to purchase a kit from Boston Museum. Last year, I used some of the money to supplement activities tied in to the kit. I was also able to get the kit on loan last year instead of having to purchase it.
- I was very happy with the Scale-Up Program, however since preschool programs are given the opportunity to apply, it might be nice to have curriculums that are specific to this age group.
- I would have liked a student packet.
- I would have liked some training before implanting this material.
- I wouldn't make any changes!
- Identifying mentors who were available during the daytime to help students.
- Implementation was very smooth.
- In my situation I chose to implement during the school day. I have 6 different classes during 3 different trimesters. Trying to keep up with documentation is a hassle. I don't think we need to survey all the participants. A sample would give the necessary information.
- Initially the software license was a delay, but we worked through it.
- Initially, I had no room, yet administration at Winterset was super.
- Insufficient time scheduling was a huge barrier. I was unable to cover the material in time allotted, which was 1/2 the required time.
- It didn't really flow with any of the FOSS kits I teach in third grade.
- It is a lot of information to get taught in one year.
- It is difficult to fit all the lessons into an after school program.
- It is hard to chisel out the time to teach science BUT I managed to do it and my students loved it! Starting mid-year (our kit did not arrive until after Christmas) meant changing schedules and that was difficult.
- It is very time consuming. I had to change my schedule around to have time! For the organisms unit, it takes lots of room to display everything.
- It seems like anything you (I) teach for the first time has room for improvements or fine tuning. I learned a lot about what I can expect from my students, how I can "do more" with a better understanding of the curriculum activities and how time can be used MOST effectively for my students and myself.
- It takes time to implement these programs, and time to make sure they are being effective and used in the way intended. That was the biggest barrier, time.
- It took a lot of preparation.
- It took a lot of time prepping for the labs. It was a long unit for first grade.
- It was a disappointment to not be able to offer the students a chance to see college students and adults in STEM related careers in action at their worksite or college classroom labs.   Last year the students benefited from seeing college students and adults engaged in STEM careers at the UI Mini Medical School, UI College of Engineering, UI Geology Dept., UI Chemistry Dept., State Archeologist, Iowa City Children's Museum, like they have in years past. The STEM field trips made the careers seem exciting and gave the students something to aspire to in a concrete way. The STEM field trips were a way to connect our EiE kits to the real world work of engineers and scientists. It was also made it hard to collaborate with scientists and engineers for our STEM program. They can offer more on site than they can as guest speakers. There is tremendous value in having the students step foot onto a college campus too.
- It was a very timely program. It was difficult to get everything done in one lesson.
- It was difficult going through 6 sections of classes. It may have been easier to do it has a whole class to make sure I could cover the content. Also, the amount of content presented in the Scale-Up program is a little overwhelming especially with the shortened window of time we have to do the program.
- It was very messy. I had to use bigger drop cloths to catch any water that might have come out accidentally.
- It was very time consuming to plan each day.
- It was very tough to figure out what to grade and how to grade the labs and questions as there isn't an answer key. It can be tough to check for student understanding.
- It would have been great if the notebook prompts came ready to copy like the student activity sheets. This would especially be helpful for kindergarten students who can't write the prompt as easily in their notebook. I had to spend time typing and copying these prompts before class started.
- Just getting comfortable with the materials, the curriculum, and the concepts.

- Just the different approach and teaching something new.
- Just the startup of the projects.
- Just time consuming to understand what it was I was going to be teaching and get things ready prior to labs.
- K-3 students did the pinball lessons but many did not take time to draw accurate diagrams. Next time I'll model more carefully and even go through one with them together. Grades 4-6, one student wanted to make his smaller and had a difficult time trying him to keep it the same size as the model. During the Skimmer exercise everyone stuck with one design and only altered the mast height. It was kind of like watching a herd of sheep even though the group had the freedom to build and change their own designs. For the gravity cruiser one student used rubber bands for tying the lever arm to the axle. I allowed it and the student was successful (car went 3 meters under its own power but it was from the energy of the wound up rubber band) and I'm not sure I would allow that next time, which takes away from the student inquiry method. I'm thinking guided inquiry is best. In K-3 the kids liked reading Malarkey well enough but I thought it was kind of a lame introduction to engineering, it modeled failure and giving up and turning his mouse trap into a hat!
- Keeping living organisms alive while teaching previous lessons.
- Keeping the students focused on the task at hand for the first 2 lessons.
- Keeping to our game plan once the school year started. Keeping the interest of all parties involved - our cyber defense team stayed interested. Our programming team sort of died out.
- Knowing the number of students that would sign up for the program was difficult. Thankfully my provider, Monica, was very easy to work with and get the correct number.
- Lack of amount of time to cover curriculum.
- Lack of computers for implementation and software issues with licenses and numbers not being readily available.
- Lack of equipment and supplies prevented me from implementing the total AFNR curriculum. I had to skip several labs/experiments due to no materials.
- Lack of time, but I made it work.
- Large amount of set up/prep time.
- Learning curve on Auto Cad Inventor.
- Learning the material myself.
- Lessons were very difficult for second graders.
- Lots of time to set up investigations.
- Mainly as stated previously, our schedule was already in place and I was only able to teach the first half of the course.
- Many of my students did not have prior knowledge on compounds and mixtures.
- Many of the experiments were said to be inquiry based but they were step by step procedural with a definite outcome. After tweaking the questions they were more inquiry based.
- Many of the instructional CDs did not work on our school's MacBooks. Our IT technician indicated the software was out of date for our operating system.
- Materials from Carolina Biological were not user friendly.
- Maternity leave, not having any other teachers involved, computers.
- More time to implement it, along with several more days of training.
- My barriers were very minimal. Only labs excluded due to large or expensive equipment.
- My biggest challenge was just time. I struggled to find enough time to work on my own while preparing for each class. Hopefully now that I've taught it for a year I'm more familiar with PLTW and will do a better job. Also, I sometimes struggled to remember how to do certain things. It wasn't because I didn't learn them in my PLTW training, I just couldn't remember some of the stuff months later.
- My biggest struggle was myself, which I assume will get so much easier the second time teaching this program. It was hard to remember some stuff from the summer courses! Also, as hard as I tried to pace the class accordingly, we somehow still ended up being a little rushed at the end.
- My curriculum director wanted me to use the Plant Science (case only in the areas that matched with our current curriculum. So it worked pretty well, but implemented in classes where it matched up.
- My main challenge was having too large of an age span of children together for the amount of volunteers I had to assist me.
- My principle thought CASE should have been used to pick and choose certain lessons to teach, not an all included curriculum.
- Needed more sticks for the rubber band glider. Also needed more rubber bands for the launcher they broke very easily.
- Needed some training to be able to adequately implement. There was a training at another school that I was able to attend that was extremely helpful.
- New curriculum can always be challenging.
- Next time I need to have parent volunteers. One person trying to supervise 23 students in groups of four was rather trying!
- No challenges - it was a very straightforward implementation process.
- No challenges.
- No problems or barriers.
- No real challenges or barriers...it fit in nicely with what we already had in our curriculum.
- No, the program was well planned and the kits were very complete.
- None. (53 responses)
- None - it was great.

- None at this time. (4 responses)
- None at this time. Good program.
- None really. Not having enough shelf space.
- None was experienced!
- None, students enjoyed it
- None, the materials were all ready for use.
- None. I did feel that the teacher guide needed more specific details in the implementation of the lessons for non-science people. I had to figure out the logistics of each lesson because it wasn't written clearly enough.
- None. It fit into my program well.
- None. The material is very simple, easy to understand and implement.
- None. Things went very well.
- None. This was a great program. Some of the lessons weren't "sub friendly" so we wouldn't have Science the days I was absent.
- Not all materials were included.
- Not all online materials were available at the beginning of the school year. We also had to wait for the tables and computers to be set up because the tables did not come, but we were able to work around that.
- not enough materials for 4 classrooms (we did 2 classrooms 3rd quarter and 2 classrooms 4th quarter)
- Not enough sand provided and the amount of set-up and prep time needed to do the experiments.
- Not enough time in my science periods.
- Not enough time.
- Not having enough time with the kids to get everything done!
- Not knowing when to order live specimens made it very difficult to make sure that they arrived on time. I also would recommend having a text for each student, while still working collaboratively.
- Not very inquiry based
- Nothing. (2 responses)
- Number of students.
- Once I had an appropriate kit to use, the implementation went well. The instructional materials were easy to use, and the students were intrigued by the content and investigations.
- One of the biggest problems we had was in getting the software loaded onto student computers. We only had 6-weeks for each class, and it took almost a week to get the software onto each computer. By that time, I had lost some of their interest.
- One of the challenges was building partnerships with the colleges and local industries. We were able to introduce and create awareness of the opportunities in AWIM, however, we were not able to identify individuals who were willing and available to partner at this time. We will continue to make AWIM available to local schools and home school groups by pooling our resources with surrounding counties and creating a check-out and training plan.
- Organizing our boxes and splitting materials for 2 different grade levels. Creating a 45 day curriculum out of a 90 day curriculum. Using 15 computers rather than 1 to 1. Groups of 5-6 rather than groups of 4.
- Our After School Program only meets twice a week for 45 minutes, so we were limited in being able to accomplish the Game Plans as written.
- Our biggest challenges were dealing with computers for our HyperStream 4-H club. We were excited about being able to use the school computer lab until we learned we could not load any programs. The ambassador company donated 10 computers last year that they were cycling out. They were helpful, but slow at times. Communicating with parents was difficult because most do not have email. Getting enrollment information was difficult. Although our ambassador company mentors were good they expressed concern that they didn't know how to work with middle school youth. They encouraged training on this for ambassadors.
- Our biggest challenges were dealing with hardware for our HyperStream 4-H club. We have limited computers for our program. Many youth brought their own, but we spent a good deal of time troubleshooting and trying to get programs loaded on computers and getting internet access for everyone. Although our ambassador company mentors were good and worked at learning before they taught, they didn't know all of the technology we were using. Some mentors have limited experience working with the middle school age level and don't know age appropriate expectations. We were also challenged with the facility because the number of outlets were limited resulting in using multiple extension cords. A computer lab would be ideal if we are allowed to load programs on them that we need for HyperStream.
- Our building limited us to either Monday or Thursdays after school; there are other after-school programs going at the same time that probably cut down on our numbers. Also, there are First Lego League groups going that may have cut down on the number of kids interested in working with our robots.
- Our business partnership is located thirty minutes away from our school building. Our club has no school transportation for when we finish our meetings. Our LEAs are all volunteer, a lot of time for district employees to put into volunteer work.
- Our Carolina kits arrived late and they weren't available for the first training sessions.
- Our district did not implement Chrome books into the classrooms until second semester and teachers were not prepared to implement the Defined Stem website or have the time to infuse the activities into the curriculum.
- Our fish died early in the program and we had to replace them. Crickets also died shortly after being put in the terrariums.
- Our kids didn't know what a pinball machine was and so we had to start from the ground up. We printed pictures for the second session and laminated so they could have a visual.

- Our main challenge was in waiting for our kits to arrive. It would be helpful if the trainings for the materials were offered in the summer so the materials could be ordered sooner and get to the schools sooner so we could get started with them earlier in the year.
- Our non-formal, out-of-school, opportunities are not always offered during the school year or school day. The timeline for reporting made that impossible to include true numbers for the participants in Defined STEM.
- Our organism materials arrived during a very cold spell. Many of our plants died. We replaced them with some from a local pet store.
- Our start date for STEM got pushed back with our snow days and cold weather (we were doing live butterflies and wanted it to be warm enough to release). It made the end of the unit feel a little rushed.
- Our training had a real focus on first and second grade kits. Our kindergarten kit seemed to be very different but also very user friendly.
- PD time to figure out the program.
- Place to keep all the supplies from day to day.
- Preparation of materials was much more time consuming than what I currently use. It also takes quite a bit of consumables.
- Putting Student Booklet together.
- Really time and transportation are our biggest challenges because of our "blended" districts.
- Receiving the materials.
- Room to launch the gliders. Space. The weather did not cooperate so PE could be outdoors. It is a challenge to find a large space. We finally moved tables and chairs so we could have to launching places in the classroom and one in the hall.
- Schedules of youth. Leaders not having a training in the programs myself (Alice, Mindstorm, etc).
- Scheduling as we have several school buildings involved.
- Scheduling changes at my school made the program impossible.
- Scheduling time with students due to their extensive activities, work and other.
- Scheduling. Trying to find time to get into the rooms to do WHOLE group lessons at the end of the year with Iowa Assessments and other end of the year testing. Title One Schedule.
- Several of the activities were difficult to adapt to the age range we served.
- Since Defined STEM was utilized as a fair class, it would be nice to have access to the website until the middle of August.
- Since I only meet with my TAG students twice a week, the project was spread out over several months.
- Since I received it during the year it was difficult to plan it for that group of students. Whereas, if I would have had instruction time during the summer I would be able to adapt to that class easier.
- Sketchy content; I supplemented the material.
- Snow Days - made the program run longer than intended.
- Snow days and cold days were a hindrance to making our deadline, but we kept the original start and end date with some shortened classes.
- Some of our aquarium plants died before they were used and had to be purchased from a local vendor. The amount of time to prepare/plan for this unit was overwhelming. Also needed more time to plan/prepare (as well as professional development) prior to starting this unit.
- Some of the activities toward the end of the program were unable to be completed because they needed to be done outside and the weather did not permit this.
- Some of the activities were not age/grade appropriate - but knew that ahead of time so made revisions as needed.
- Some of the activities were too difficult for younger students. We did each experiment before we presented them, and you could tell on some of the experiments they weren't tried before they were put in the program.
- Some of the content was a challenging for my students. I had to change some of the resources to fit the needs of my students. Nothing too big.
- Some of the curriculum was too advanced for the students I had. By picking and choosing I was able to create a comprehensive program.
- Some of the lessons take a little bit more time than what I am given for our science time. It was difficult to balance the lessons accordingly and fit everything in those ties together all in one day.
- Some of the materials for certain experiments were a little questionable for our student population. For example, using pins/needles with our group of students might not have gone over well.
- Some of the materials used during the experiments (pins/needles) were unsuitable for our group of students.
- Some of the projects didn't make sense and many were only directed towards outside activities. So we had to implement a couple of our own ideas and also brought in a guest speaker.
- Some of the Scales and Tails activities were very difficult for our K-3rd grade participants. For example, the box activity was very difficult and students lost interest. Other activities went much faster than time the curriculum said.
- Some wheels fell off of the wooden cars.
- Something new that the students were not used to. Getting them the do more cross-curricular items.
- Sometimes I didn't have enough of the right materials so I couldn't do an activity.
- Sometimes materials don't work like it should.
- Space limitations.
- Space was the barrier but we worked it out.
- Storage space for new equipment, prep time with new curriculum.
- Student attendance varied, and some cars fell apart before completion
- Students who had the interest, motivation, and TIME to participate.

- Supplies and set-up for the class. VERY time consuming and often times we felt rushed to get things.
- Teaching materials for Cyber Security.
- Technological: the fuel cells did not work the way that they were supposed to and this cause frustration and stress due to the fact that I could not fix them or get replacements. At one point and time I thought that I might be able to borrow fuel cells for the project from the South Central region office but when I got them they were missing fuel cells and in fact somewhere not working the way that they should.
- The amount of documentation at the end took a lot to time.
- The amount of reading and preparing was extensive. Timing the delivery of live animals was also tricky.
- The amount of time stated in the directions was not even close to the amount of time needed. This caused the program to last much longer.
- The amount of time to prepare lessons/experiments was extensive. It would have been very beneficial to have our Carolina Stem Kit on our in-service day in September 2013. We did not have enough materials to address the amount of students.
- The barriers that I faced were time to implement the projects with my already defined curriculum.
- The biggest challenge I faced was in waiting for our kits to arrive. It would have been helpful to have the training in the summer so the kits could get ordered and would be in our hands before school started or sooner after school started. This would also allow teachers more time to familiarize themselves with the kits.
- The biggest problem is finding time for meetings and mentors in each of the areas.
- The biggest challenge was time. I only see my students two times a week and we have other projects to complete. However, they loved the projects and learned so much from doing both the Jet Toy and the Glider Challenge. The Glider Challenge was a bit complicated for my 6th grade TAG students. We had to scale it down a little.
- The books are not at all kid-friendly. The pictures are black and white, and there are not many of them. The book itself is very long.
- The Carolina curriculum lacked additional resources to use with special needs learners. A lot of teacher time was consumed by making modifications for learners with unique needs.
- The CASE program is a very well organized and implemented program that has no barriers.
- The challenge for my students my using the Alice program in the 3.1 version. It was very different from the 2.2 version here at school, so it was a bit of a learning curve before we got the hang of the newest version.
- The challenges I have faced is that I do not know how to use Alice 3.2 and Lego NXT. I did find YouTube videos to help me with the Alice 3.2 with very basic things. The service provider informed me of an online class with the lego robotic kits. I was able to watch part of them. Also, I did not have a mentor until halfway through the year.
- The cost of the seeds and other materials. In addition, the amount of set-up and planning time was often challenging. The storage of items was also difficult to manage at times.
- The courses should be aligned with the curriculum used in CASE - however the courses are set up as concurrent credit for college level and have not yet been cross-examined to realign with CASE content & standards. Also did not have all required materials to implement curriculum.
- The experiments did not fit in with the SWH model that we use so we had to tweak them a little.
- The grant received was not enough to fully fund the needed supplies and materials for the CASE curriculum to be taught how it was intended. Curriculum designed for class size of 20, but did not have equipment and materials needed to do that so groups had to be larger, therefore not all students were always involved in content like it is designed.
- The GTT is a lot of material to cover and with having many other preps it was hard to really get good at teaching the material this year.
- The implementation of the entire program was too long. The third grader lost interest in the beginning because the story was too long.
- The kit was all inclusive and easy to work with.
- The main challenge I had was purchasing consumables. If some of the scale-up funding could have been used to purchase consumable materials throughout the year I would have spent much less of my own personal money.
- The main issue I've had is really not an "issue" per se; however, dealing with the materials during the school year is difficult as it is difficult to find the time to go through the tons of new materials for the curriculum - love the materials - don't get me wrong!
- The major challenge I had was time management. This will improve when I teach it again next year due to experience.
- The material was unfortunately not very conducive to a monthly afterschool setting. I had a hard time wading through the material and condensing it to an amount that is doable in a two-hour time frame (without spending all spring (several months) on one topic). Because of their length, I was not able to use the storybooks. That said, I hope to use this material in a day camp setting (longer period of time) in the future.
- The most challenging barrier was teaching Design and Modeling with only 15 computers. I had to put 2 students on each computer which really slowed us down. The district purchased the computers and refused to purchase more. The other problem also involved the computers we used. The school district allowed students and instructors in other subjects to use the same computers. This meant that sometimes I didn't have enough computers to teach the curriculum because some would be out of service and in need of repair.
- The names in the book were hard to pronounce and hard for the students to understand who was who. The vocabulary was hard for them as well. As an instructor it was hard for me to read the whole manual as it was so long.
- The only barrier was lag time with our electronic components at a school level.
- The only challenge I had was in adjusting everything down to the Kindergarten level which took extra time.
- The only challenge that I had was being unaware that it was the same kit as a previous grade had. I was led in the wrong direction when choosing which I wanted by an administrator-- Wish I would have known it was the exact same.

- The only challenge that we faced was in having enough supplies to meet the needs of all students assigned to our classes. We had to order more supplies during the year in order to complete the activities in the kit. This was not what we had thought would be the case. Apparently it was a misunderstanding.
- The only challenge was having all the equipment to implement the program.
- The only challenge we had was keeping the guppies alive with the Carolina - Organisms Kit. Several died throughout the time and the females never did have babies.
- The only challenges that I had was getting the materials and having the time DURING the school year to look things over and fully implement it while teaching 4 other subjects.
- The only difficulty is that CASE is not available until June/July. I will be implementing animal science in the fall but wanted to wait until spring to implement CASE plant so those students who could not take a class in the fall would not have to catch a yearlong course halfway through the year. Instead I staggered the courses.
- The preparation time was too high. The materials were too wordy and hard to find what I needed to know.
- The program requires a large, open space that is not available to me in my classroom. I had to meet in the cafeteria to accommodate the project's needs.
- The program was difficult to implement in the library setting for us. We had very few regular attendees and the program couldn't grow and expand the way we would have wanted it to. We still had great attendance numbers, but had to start from the beginning each time.
- The programming of robotics on the computers was frustrating at times. I have several machines that won't download the student's pseudo-code so I had to do it for them on the teacher machine.
- The range of student prior knowledge of physics concepts and mathematical skills were somewhat of a barrier.
- The reading material was above our grade level.
- The Scale-Up implementation went well. The only challenge was sometimes sourcing items for a lab activity that were not included in the scale-up materials.
- The startup process is always a challenge as you implement something new. I was excited about the course work and the hands-on activities.
- The students had to get used to using my system and going at my more rapid pace. Once that was going they did awesome!
- The time associated with the projects did not work as well with our classroom schedule.
- The time frame/ layout of the AWIM programs sometimes contrasted to what we had available. At times it was also very specific to how specific groups needed to be formed -which provided a barrier when/if we had varying amount of participants per activity, etc.
- The time required for PD to acquire said curriculum.
- The time requirement that this program required. I did not realize how much time this unit was going to take.
- The time to do it, but I am more comfortable now with the time needed.
- The unit was wonderful but I would not teach the unit again during the winter months. The live organisms were shipped and came frozen because of the Fed Ex warehouse storing them overnight. Carolina replaced the organisms, but I got off on my timing of the unit because I waited for new organisms. I will teach the unit either in the fall or the spring so there are not issues with cold temperatures. Carolina Biological was great about replacing the organisms, I would teach during milder months.
- The websites in manual were not active / the description and function of the PEM was very complicated to understand for this age group. / RFP was vague and more examples would have been helpful. / It seemed to me that the students were required to have some prior knowledge of the engineering procedures. I found that they were very unfamiliar with the process of designing and implementing their ideas. I know the student is supposed to be discovering and learning but I just think that a little background of the process would be helpful.
- There are a lot of materials and activities provided and with a limited time I had to pick and choose activities. This is and isn't a barrier/challenge.
- There are challenges with holding meetings because students are involved with many other activities. The students that are not involved have challenges with getting home from the meetings.
- There is a lot of material for a teacher to understand and go through the large binder before implementing. Some of the information was duplicated in other areas of the book. Timing of the lessons seemed to take much longer for me than the possible allotted time written for each lesson.
- There is so much more to do than this initial push to really make an impact.
- There seemed to be more to do in the amount of time for one day than it said in teacher manual.
- There was an extensive amount of teacher preparation for many of the lessons in the kit.
- There were only a select few areas that I used because it was intended for a more mature class. My class this year needed extra guided help and this was above their capabilities in areas.
- There were some issues with the student view. It would not show all of our products or too many products.
- This particular Scale-Up program was not what I thought it was going to be. This year was dramatically different than the previous year and I was not aware of this until I went to the professional development for the program.
- This school year, I did not have an assigned classroom and had to travel from room to room throughout the day. This curriculum required a large amount of classroom space, so my classroom situation made some parts difficult to utilize.
- This survey is intended for school implementation, not afterschool or other programs. Much of it does not apply.

- This was my first time and I taught the class twice a week to two different groups of children. I didn't always understand the point I was supposed to get across with the first class, but by the second class I had it figured out. I think I will be much more comfortable teaching it again now that I have been through it once.
- This were new inquiry-based labs which I hadn't done before, so before implementing & having the students start, I had to get everything organized and looked over. This really isn't a negative challenge- it is a positive one- I was able to do become more familiar with the unit topics and current events dealing with applications the student would encounter. All of this makes me a better teacher and lifetime learner.
- Time. (2 responses)
- Time and competing with other activities.
- Time and knowing how long things would take.
- Time and paper work.
- Time commitment. (2 responses)
- Time commitment from students, getting female students to participate.
- Time commitment in the science classroom.
- Time constraints.
- Time constraints and space. (2 responses)
- Time constraints and the fact materials need to be shared.
- Time constraints were the only challenge.
- Time constraints...it took a lot of prep time to set up to do the experiments.
- Time crunch, going from 8 weeks down to 6 weeks.
- Time during the school year.
- Time in the classroom - it is difficult to implement the lessons when there is not adequate time in the schedule for science instruction.
- Time is not taken into consideration when money is granted for this type of implementation. My time in set-up and planning is worth something and hopefully can be part of the reimbursement in the future. Also, I used to do my STEM program as an after school option - an extra opportunity for students to learn in these subject areas, but my school does not pay me, so I inserted this program into my already packed curriculum. Not as effective as in the past. If school districts and the state want these types of initiatives implemented, they must start paying teachers for their time and talents and not only for the materials and training received.
- Time of year... we were doing soil sampling lesson when the ground was frozen.
- Time restraints; we do not have enough time allotted for science in our scheduled day.
- Time to complete all stuff.
- Time to implement the Scale-Up program when teaching Art classes.
- Time was a challenge.
- Time with students.
- TIME!!! I met with my students twice a week for four months and STILL didn't have enough time to cover everything I wanted!
- Time, weather when releasing the butterflies.
- Time. Figuring out how to fit it into our pacing guide and deciding what to scale back on.
- Time. We barely have time for Science as it is, and the kits are add ons to the already existing FOSS kits.
- Time...Everything was set up great however I was not sure what I could give up to accomplish all my goals.
- Time-Each component took a lot longer than I thought it would.
- Timing - Scale-Up program has odd schedule for school year and CASE schedule.
- Timing of the activities has been a little bit of a barrier since we are implementing the program as an after school program. Some activities are longer than others, so we have had some problems with implementing all of the activities for each group in the time frame we have.
- Timing...we were ready to offer the program as early as September but products and PD were not in place. We are also an out of school provider.
- Took a lot of extra time to get use to and be able to use Define Stem website.
- Trouble getting the servers set up and materials together for cyber defense.
- Unit took longer than expected, but was worth it!
- Waiting for the order to arrive prevented us from instructing the units earlier in the year.
- Was directed more towards older children. Also, was a little difficult to break up into sessions & have the kids remember. Became redundant to implement.
- Was expecting to receive lesson plans to assist in implementing the program but received nothing.
- Was pretty overwhelming at first.
- We are not an in-school group. Some of the recording and training is based for in-school type of programs, the setting we work with youth in is afterschool/day camp settings.
- We did not have a mentor and meeting times were a challenge with all of the other after school activities.
- We did the Carolina Stem Weather program. I should have looked through the entire program before beginning to take in consideration the Iowa winter weather. Some of which was awesome for the program; some that caused us to make minor changes.
- We didn't have enough time to get all curriculums and lessons completed.

- We had a large number of kids sign-up and then not show up. We filled all our spots for our program (30) but only had 14 actually show up and participate.
- We had some computer issues at the beginning. These were fixed and had very few issues from then on. Along with computer issues in the beginning I also had the issue of student background knowledge. They lacked some of the background knowledge that was essential to move on in the program.
- We had some confusion with the Alice3 required software and the textbook explaining how to use it and exercises to try was for Alice2. This was not the Service Providers problem; this was the only available textbook. We could work with it but not complete the exercises completely because of changes in Alice3.
- We had some difficulty with software at the beginning.
- We had to postpone the start due to weather and has caused us not to finish the activities.
- We have a very similar curriculum in 3rd grade right now, and until Iowa adopts Next Generation Science Standards, we are stuck with what curriculum to teach.
- We have not yet implemented the Scale-Up program, but I do not anticipate any issues with the program.
- We ordered 4 kits. We really like them all, just due to time, weather restraints this year; we will not finish them all. We each will end up doing 3 of them a piece, which is still really good!! We were able to share the kids and had enough materials for both of our classes, and we could do these kits at separate times. So for example: My teaching partner did the "Pattern's All Around" and I did "My Senses" so that worked out great. And now we can switch them. I am currently doing the "Earth Materials" and she is doing "Push, Pull, Go" (I need to plan better, and start with Earth Materials or end with Earth Materials!).
- We ran out of time given the current curriculum. Training happened a bit late for me to help other teachers make adjustments to their schedules. I could adjust mine, just fine, but I saw that I needed a bit more time to pilot the program so other teachers could see what happened, how long things took, how to do it, etc.
- We received some damaged equipment. Some paperwork was lost and materials arrived late.
- We still have not been successful in finding a business partner.
- We struggled with getting the materials we needed for the class.
- We were challenged to complete the unit in the time we have available.
- We were using AWIM in an after school setting. We met over time and had to spend time on review. Would like simple and easy to use recording sheets for youth to record their time, distance .etc. Had to adjust some units to meet needs of 4-5th grade audience who did not have a lot of science background
- We would have liked to have our own grade level kit to experiment with during the training day.
- With it being the first time implementing it - I didn't look all the way at the end and missed a few of the assessment tips. It will be easier next year.
- Working with school administration and guidance personnel was challenging. My suggestions about student enrollment (appropriate age/grade, prior knowledge, etc.) were not always considered.

What did you find helpful during the implementation and would you recommend to others?

- 2 Week PLTW training at Iowa State University was awesome!
- Access to the e-books and materials which was shared with us during the professional development. We have a high propensity of 1:1 use and providing students access to materials outside of class hours was very beneficial.
- Administrative support, community knowledge
- Administrative support, grants, two week training period
- Administrative support, training
- All material was easy to find and lessons are easy to read.
- All materials were easy to find and use, manual explains things well, pictures in manual were awesome!!! Also great questions to discuss.
- All the materials were available in the kit. I did not have to spend extra money for supplies required to complete the lesson as written.
- All the materials were in the boxes and directions on how to use them.
- Allotted time that would not take away from our large group reading.
- Allowing enough discovery time before jumping in with the teaching.
- Always read ahead and practice the lessons beforehand. I had Circuits, so I always made sure to test every circuit or activity before implementing in the classroom.
- An engineer of a local manufacturing plant presented to the class at the conclusion of the unit.
- Another teacher (such as a math teacher) to share ideas and connect with.
- Attending the CASE training, which is required, made the transition very smooth & helped make the implementation process run smoothly.
- Attending the NW Hub's STEM training in Defined Stem.
- Attending the training session was helpful for learning about the online resources with additional information, videos, etc.
- Be prepared to have materials available when needed.
- Because of uncooperative weather, I was never able to take students to the creek that runs near the school, or to the one that runs through town. I was hoping to be able to test the pH of the soil and pH of these two creeks. It would also have been beneficial to have participated in IOWATER training, as a supplement to my kit, which was "A Slick Solution: Cleaning up an Oil Spill".
- Beginning training day was helpful.
- Berkley Technology Mentors were huge for me. They were an encouragement for the students too. I would encourage moving the gaming, robotics, and multi-media to the junior high/middle school level. These students are less busy and they are more impressionable. By the time they are in HS, there are too many activities to choose. Cyber defense should be kept as a 9-12 competition. It helped me to have a 7-12 club because there were older students who could model for younger students. The community service project was very helpful to have a 7-12 club.
- Book with all the information in it was wonderful.
- Bringing in expert engineers to talk about the design process, gear ratios, forces, torque etc.
- CASE institute - allows teachers to experience the full course, hands-on, individually.
- CASE is very helpful, material is very useable.
- CASE is very well organized and useful.
- CASE training in summer.
- Collaborating with other first grade teachers in the building also implementing the Scale-Up program.
- Collaboration with other teachers.
- Collaboration within our district and buildings helped with implementation. Our head teacher was very involved and helped make implementation very successful.
- Collaboration within our building and within our district helped with implementation. Coordinated with our Head Science Teacher.
- Communication. Adding my schedule to the MAIN school calendar. I made flip charts of all the lessons. Over planning.
- Connecting with other schools that have a club to share ideas, mentors, and resources.
- Curriculum and lessons were very detailed and user friendly.
- Curriculum was well layout in the teacher guides. A large amount of materials to manage and organize.
- Defined STEM allowed us to add depth to our program planning and made us aware of unique ways to present our programs. We were able to adapt the challenges to our unique situation.
- Detailed lesson plans, ways to score rubrics.
- Directions were very clear.
- Discussing issues with other teams teaching the kits in our building.
- Do all the required experiments first to make sure they work and you know how to trouble shoot.
- Don't micro-manage. Let them do some of the work on their own. Have deadlines for the students. Be willing to meet weekends and breaks if necessary.
- Don't worry if it takes longer than you think it should or longer than the teacher manual says it should!
- easy to follow website
- Easy to navigate the teacher guide book. Nice black line masters provided.
- Easy to use and it was helpful to be at a training class with another co-worker.
- Everything I needed was included for all activities.
- Everything was ready and the CD helped me be prepared to teach the lessons.
- Explanations of the defined STEM program and navigation of the website.
- Finding reliable volunteers is difficult. Wednesday is our early out day for teacher in-service. The library offers programming to provide a safe place for kids to go after school. Wednesday is also Church day in this community and some kids went to their program and then came late to ours. We didn't require everyone to participate in the entire program. Kids were free to come and go as they pleased.
- First and foremost, the trainings provided by CASE are necessary and very important for understanding and implementation of the curriculum. To teachers implementing the curriculum I would also recommend a strong organizational plan. I used a lot of plastic totes and containers with a labeling system as well as a filing system.
- First training.
- Focus on one program at a time instead of letting students pick. Give the students choices within a single program.
- Following the manuals and staying out of the way of the students' exploration.
- For after-school providers, get other business partners on board. Invite them to participate or observe -- this will cement opportunities for future partnerships.

- For those that are not working through the schools, ages and stages and age-appropriate expectations, and developing a lesson plan would be helpful to partners. This has become evident after two years of working with HyperStream ambassador mentors. Some have even voiced the need for pedagogy training. This is something that ISU Extension and Outreach can teach. We know now to start out the year differently with our ambassadors by learning more about what they know and are comfortable with and determining what is needed to make the experience as educational and interesting as we can for the participants.
- Get everything loaded on to computers prior to training and during the summer before school starts.
- Going through the lesson during training was helpful for a better understanding of what to expect. Also using Communities of Practice for communicating questions between instructors was great.
- Good hands-on training that we were allowed to play and explore the curriculum hands-on.
- Good pre training and practice.
- Good training, great supplies and materials, thorough instruction manual with lesson plans, good program in general
- Good, hands-on experience for the students.
- Great hands on and high level of thinking.
- Great information and communication from Carolina Curriculum. Great hands on materials!
- Great instructions and fun hands on materials.
- GREAT PLANS.
- Great training, great local support.
- Had a high school teacher that does PLTW so could go to him for advice.
- Have colleagues to work with. There are 2 coworkers who took the class and my classmates from Iowa State helped me with my questions.
- Have more frequent meetings to maintain student interest.
- Having a chance to collaborate with grade level team.
- Having a class set of books.
- Having a teaching partner for the after school group.
- Having a volunteer to help out during the construction of the AWIM products.
- Having all the materials needed is great!!
- Having community engineers come in to speak to students is really effective. Also, visiting an engineering college was a great field trip for students.
- Having gone through it once already helped out.
- Having Jackie Leonard available to ask questions of was invaluable. She is the main GTT teacher in our district and is a Master Teacher for PLTW.
- Having mentors helped, understanding the programs used helped also.
- Having professional development during the school year to help with implementation of the kit.
- Having students work on projects at home and then able to apply that knowledge in class.
- Having supplies and downloads ready right from the start. We had our Scale-Up kits at the start of school, but still had to get everything downloaded to the student's computers and get the other necessary supplies ordered (glue guns, rulers, calipers, etc.)
- Having Tamara and our mentor (Jennifer) really helps. They bring in different perspectives and lots of knowledge.
- Having team members to collaborate with.
- Helpful training.
- Hosting these events in your school and local hospital were key for us. Students were able to really connect. I am thankful the DMU was willing to drive all the way up to Grundy Center.
- Hyperstream provided great materials and equipment.
- I really liked using the program on the computer. Easy to use.
- I am capable of understanding the needs of third graders and had full support on my changes to successfully implement the unit.
- I am fortunate to have two strong parent families that support the HyperStream/Robotics programming at the school.
- I appreciated the collection of supplies provided.
- I attended the PLTW conference and gained useful information from presenters and other teachers.
- I broke the story text into parts and broke the audio text from the CD into parts for learning. This helped students to retain and interact with the text. We made surveys for the other classes to fill out for Strawberry orange juice selections and graphed each class's information adoring to class, boys/girls and age group. Then compiled the information into a final graph.
- I contacted my PLTW instructors when I needed help with the curriculum. They were great getting back to me promptly, sharing ideas with me, and offering support. We also have a similar, but more advanced course, being taught at the high school level. The high school instructor has been teaching his course for a couple years and was a good source to go to when I had questions about the program.
- I felt that the training we received was very helpful.
- I felt the materials were excellent.
- I found everything/everyone very helpful.
- I found it very helpful to receive the training prior to implementation. The video was very nice to have.
- I found NAAE communities of practice helpful. I also liked that I could collaborate with other local ag teachers and get advice on what worked for them.
- I found that doing the training was helpful in implementing the CASE Curriculum. I would suggest your administrator come to the training for a day if possible.
- I found the binder that was provided very helpful.
- I found the CD helpful for certain activities.
- I found the many lessons in each unit to be very helpful in teaching the material. Read ahead, practice each lesson and remember to have students build on previous lessons.
- I found the pre-planned curriculum and materials very helpful. I would recommend this program to others.
- I found the representative for the company to be very helpful. When I had a question, she worked to make sure I would find an answer. This made my implementation more successful.
- I found the teacher's guide extremely helpful. I loved that it had all the lessons, CD to download lessons, everything organized and ready to go.
- I found the Teacher's manual very helpful and also the training that was offered was very informative.
- I found the training helpful and the EiE website with training videos to be useful as well.
- I found the training very helpful.
- I found trying it before the students used the product was very beneficial.
- I have a classroom aid and she was wonderful in helping me have all the supplies for the day ready. Set up ahead of time saved time during the day.
- I have had guest speakers (engineers) come to my class to share information with the students and have gone on field trips to local businesses (Almaco Manufacturing and DuPont plant in Nevada). This has a big impact on my students by getting an up-close look at real world applications.
- I have used Carolina kits for many years. The organism's kit was one I wanted to try. The success of this kit would be better if used at the beginning of the school year.
- I implemented Hyperstream as an exploratory class, not as a club. That is useful in that students are committed to continue,

but it was difficult to know what they should accomplish in the time we had available.

- I liked the PD training that I attended. I really gained a lot of information during that training.
- I liked the process the manual gave.
- I liked the trainings we had. I also liked all of the STEM opportunities such as the STEM day and the conference!
- I loved having all of the materials sent with detailed lesson plans.
- I loved that the curriculum was day to day. I was able to modify as needed and students ended being excited to learn the information I used in CASE-Plant.
- I loved the step-by-step instruction manual.
- I made notes as I taught about how I would teach it again next year. Lesson times, hints to make group work smoother.
- I really didn't find much helpful.
- I really like the curriculum and the training was excellent!
- I really liked the teacher's book. It was well put together and easy to follow.
- I showed some gear videos from YouTube, Showed other about different types of engineering. We did problem solving for team building.
- I taught these lessons as a whole group instead of as a small group center and had a community volunteer to help with each lesson.
- I think it is really useful to have a list of contacts to talk through initial implementation. This kind of thinking represents a change in traditional science education (the open-ended engineering component.) Next year I will be able to provide that for others, but for first time implementers, it might be good to encourage connection with others who have already tried it.
- I think that the CASE training was very helpful.
- I think that the materials and experiments were very organized.
- I think the training that we had in the fall was very helpful. It helped me understand the goal and focus of the Scale Up program.
- I thought I could have used some more extensive training.
- I thought that most of the lessons were very well laid out and explained. I had access to a resource person in a nearby district who was very familiar with the program and who could help me if I had any questions.
- I thought the Carolina STEM program is really good. I used the one about chemistry, and it did help that I am a chemistry teacher. If someone is not trained specifically in science, he/she probably would want a resource in the district from whom to get help. Also, there needs to be adequate prep time before activities.
- I thought the pintables were really helpful and useful. It made it easier for the students to understand the content.
- I thought the workshop was most beneficial letting us try by error and adjustment which is pretty much how I taught the class. The materials were great, well organized and plenty. The lesson designs are well written and have clear objectives.
- I used older kids to help set up some of the items. They also worked with my students during the planting process.
- I used play dough for rocket weight inside straw instead of clay. The clay was heavy and did not seem to move up and down straw as easily as the play dough did. Step-by-step directions were very helpful. Images were also very helpful.
- I used this as a follow-up to my science unit.
- I was able to call and talk directly to the AWIM instructor when I had issues.
- I was fortunate to attend a training offered for librarians. I would encourage more training or STEM opportunities for librarians who provide children's programming.
- I was grateful I had attended the training at ISU! I also found that the more I familiarized myself with the plan, the more comfortable I was (and my confidence grew). I also had a colleague teaching another group and we collaborated well together.
- I worked with a teacher with more science background than I, so she was able to bring some students along that needed or could handle more of a challenge. The previous training I had had at workshops was also very helpful.
- I would recommend having time as a school building to view these projects to allow for an implementation plan.
- I would recommend the CAROLINA STEM kits. I found the materials to be extensive and easy to work with. Our collaborative team worked together to make the most of the kit.
- I would recommend the training.
- If there were any questions I could always call for help.
- If you can figure it out, the Define Stem website has some very helpful information.
- Immediately have the students make goals with timelines and follow them as close as possible. There was a lot of procrastination going on and I will help coordinate the projects in a timely manner better next year.
- Implementation should be earlier in the year and the participants may need a year to sort through the materials - this is a good thing - but it does take time and it is hard to sort materials while you have class going.
- Implementing it with SWH was very helpful; it allowed the class to complete mini investigations to help discover characteristics of matter. The experiments were set up so students could complete them on their own with little intervention from me.
- Information from Carolina Biological on Science Note booking was beneficial. I am planning to implement this practice on a wider scale with science next year.
- Initial training was very helpful. (2 responses)
- Instead of parent volunteers, I was able to use high school youth volunteers to help carry out the program.
- Initial Training was very helpful.
- Inviting parents to a celebration of learning at the end of each session was a great way for kids to share and for parents to see all that we accomplished.
- It is important to attend training and be able to connect and network with fellow educators. It is also helpful to spend time looking at all aspects of the lessons and creating a folder for lessons that would fit the needs or interests of your students.
- It is very important I think to have a good handle on the current competency of the students.
- It is wonderful that the STC kits provide all the materials needed to conduct the labs. I used to have to "find" things to use or we had to buy the materials. It provides cooperative learning in an organized manner.
- It really is a great curriculum that takes some of the guesswork out of the teacher’s hands.
- It was all pretty easy, thanks to the professional development I attended and the teacher materials that come with it.
- It was a user-friendly manual with many recording sheets for students to demonstrate their understanding.
- It was best to have a small group!
- It was convenient that the kits came pre-packaged and designed to be ready to use. It was a time saver and made an after-school program possible to implement.
- It was great to have a mentor text with Rolling Things. It would be great to have one for each unit.
- It was helpful just to play with the website and take the time to learn it.
- It was helpful to have a small group of kids. I think if we would have had more than 12 kids at a time (with one or two adults) that it would have been very difficult.

- It was helpful to work with Kim to get some ideas for how to work with the current setup. It was also very helpful that I have an administrator that really fought for me when we had technology issues regarding licensing issues as well as he helped me problem solve with the issues that we had with our own tech director on this program. It really is a team effort and all members need to really be involved in the process (all parts from training, meeting prior to the beginning of the school year, etc.).
- It was nice to work with community members from Ruffalo Cody. They were very knowledgeable and understanding.
- It was nice working with another class and teacher. We each did our own kit, but could bounce ideas off each other. It's nice to have someone to work with when you are trying something new.
- It was relatively simple and there was good communication between all parties.
- It was so wonderful to have all the equipment necessary to perform the labs. I also like how it not just paragraphs upon paragraphs of reading like an old textbook. Inquiry based learning is done in cooperative groups which helps students succeed more efficiently.
- It was very help to gain ideas and examples from even if I didn't use the specific tasks.
- It would be helpful to have actual training in Alice 3.2 and Lego NXT in order to help the students.
- It would be recommended to have plenty of hours of professional development to prepare for the instruction and set up.
- Items were useful and students seemed to learn, but a list of who was doing what in the EiE would have been nice for email support and ideas.
- Josh Remington, Iowa FFA Foundation Executive Director provides us agricultural educators with excellent information and this communication supplements the SE District Scale-up coordinator's efforts. Agricultural educators in Iowa have an awesome network and it makes projects like Scale-up easy to do from start to finish.
- Journaling- Responding to the journaling seemed very powerful; students expressed more thoughts and ideas. They always wanted to read my response back to their entry.
- Just going through this the first time, I have learned I need to give myself more time to complete this particular program to its fullest. I would have loved to extend each kit into more than 3 weeks.
- Just realize the project will take time ....both planning and with the kids.
- Kids enjoyed it and found it to be very engaging!
- Kids loved hands on...they liked working as a partner and collecting data.
- Kids loved it.
- Kids loved it and it was very engaging.
- Kits were very well stocked and provided all materials needed.
- Knowledge of hands-on science.
- Lesson plans are set up in an easy to use manner.
- Loved the resources; helpful partners.
- Lynne Campbell was very helpful while I implemented. I was pleasantly surprised at how "user-friendly" Defined STEM was!
- Maintain a good relationship with other instructors in your area who are also implementing a STEM Program.
- Make copies of the names of the rocks and minerals and tape them to the front of the binder. Then you have them and don't need to search for them later.
- Make sure software is ready to go when you begin your school year. Make sure that your boxes are organized into kits before the school year begins.
- Make sure you stay up to date on what supplies you need for the class and when.
- Making out journals ahead of time.
- Making sure the materials get to you on time. The prep time is a lot when all the materials are new, and you need to set up and label, etc. Also, attend a training it helps to look at the lessons.
- Making sure to plan adequate time for the program.
- Material organization with the Vex robotic kits.
- Materials arrived on time.
- Materials ordered.
- Mentors coming in to help.
- My administrative support was top-notch!
- My administration was very supportive as they let me attend the CASE training in Arizona and paid for some of the travel costs involved. The training itself was very beneficial and the chance to visit with other ag teachers later in the year about CASE lessons was very valuable.
- My administrators are both VERY supportive and willing to help in any way possible. We are usually only allowed one field trip but they felt it was beneficial for us to visit our community sponsor after he came to school and shared a power point and information about his job. We found ways to connect learning with many of the things we worked on in other subjects. / The father of one of my students had access to real pinball machines and he brought it to school and opened it up and told the students about it. Then he even gave them each a chance to play it. On that same day our resource teacher shared her room with us so that all 20 students made pinball machines could be displayed and tested by the other students.
- My contact person, Angie DeMoss, answered every question in an extremely timely fashion. She also came out to visit me to help me take inventory and figure out which supplies were to be used at different times.
- My contact with another middle school teacher who has already used the unit for several years.
- My recommendation would be to get even more volunteers and parents in the classroom to complete the program. The students really like showing off their projects. Also, I would try and work with other teachers and curriculum areas to implement the program.
- My students were actually the most helpful. They caught on to everything so fast! They taught me how to do a lot!
- My teachers from this summer, Susan Lyons, and Mike Coltom were an awesome resource when I needed help.
- My team of teachers did a lot of sharing.
- My training was key!
- Next year I will type up more questions that go along with the readings to make sure students are getting the important concepts. I will also view some of the organisms using the Elmo/ Video Projector so that students are not burned out on the microscopes as quickly.
- Once the lengthy set up/prep was completed, the lessons were easy to implement and very student centered. Self-discovery was evident in all lessons.
- On-line assistance was invaluable.
- Ordering materials would be nice after the actual course is taken in the summer, but ordering materials ahead of time so that a person can unpack them early and identify what you have is great. Partners in the community to come in to discuss key points and perform labs with kids is awesome, make community connections!
- Other Ag Teachers in provided outstanding support and leadership. They were always available if I needed help.
- Our local college allowed us to use their new computer lab so each student had their own computer for exploring Alice3. We had our oldest high school boy prepare with our mentor and

help lead Alice3 sessions which challenged him in leadership and was a good role model for the younger members. Also, the college allowed us to use their video cameras and video lab for our multi-media sessions.
- Our mentors from Berkley Technology Services were excellent. Go to the web site for IT-Adventures and look at pictures.
- Our students enjoyed the activities, however having time to prepare for the activities were limited.
- Our training was very interactive. I LOVED the energy our presenters possessed!
- Our training was wonderful. Someone came on a professional development day and went step-by-step through the program, teacher manuals, and kits with us. We then had time to get acquainted with all our materials.
- Overall, the Experimenting with Mixtures, Compounds, and Elements unit was a good learning experience for my 8th Grade science students.
- Parent volunteers are helpful, local industrial partners, and the World in Motion workshop.
- Part of this unit was implemented by a class from the college. It was helpful to me as a first timer to watch the unit unfold.
- Partnering with parents/community members involved in engineering, marketing, and sales.
- Peer.
- Pictures in manual.
- Planning extra activities and related crafts, icebreakers, and relevant experiments. This helps showcase relationships between the terms and apply them to multiple settings as well as give the children a break while experimenting with different mediums, environments, and groups.
- Planning to have a parent volunteer come in to prepare materials ahead of time.
- PLTW internet based programs.
- Professional development was very helpful in preparing me to teach this class.
- Quicker training so that programs could begin sooner. Somewhat difficult to coordinate since we are out-of school provides.
- Read ahead! Always know what your lessons will be for the next day. There are some lessons that require a lot of preparation, so always practice beforehand.
- Read the entire book in one day. Do STEM activity every day!
- Read the teacher's manual and align it with the Common Core.
- Reading through the manual beforehand and planning an agenda.
- Realize that implementation is a big commitment of time. Extra adults would be helpful to have on hand, if possible.
- Received a lot of good support from all parties.
- Record sheets already made up very helpful. Organizing things myself rather than taking class time and have students do it.
- Recruit Volunteers! Get people willing to help so that it frees up the educators and can get more STEM opportunities to our Youth.
- Resource book and guides were awesome! My EZ Way Inc. - People were excellent with follow up field trip on machines and Industrial Engineering
- Resource page on PLTW website.
- Scheduling everything out ahead of time and mapping it out. And having expectations and guidelines for middle school students to follow. Without a lot of structure, this type of club will struggle at the middle school level.
- Short videos/pictures of finished stages in the design process.
- Showing students online videos about gears.
- Since this was unfamiliar to me also, a teacher really needs to do some research into how engineers do their job, what they do and what is required of them. I thought the list of suggested subjects for the volunteer were helpful to let the engineer know what information they needed to share. Looking ahead through the whole program and figuring out what the students are expected to know would also be helpful.
- Support from TAI and mentors - invaluable resources.
- TAI provides a network of support for HyperStream Ambassadors from other HyperStream clubs across the state. TAI has been instrumental in providing knowledge sharing and collaboration of project ideas.
- Take time to look through all of the resources Defined Stem offers- there are some great applications to extend the current curriculum!
- Talking and comparing notes with others that received the EiE scale-up materials.
- Talking to other teachers who were teaching CASE.
- The 1 day training was helpful prior to implementation. I guess the only barrier I faced was not getting enough juice cartons donated for the final project to we had to delay two weeks. I also created a flipchart for the lessons prior to building the sail and windmill to better help guide the questioning. This allowed me to pop up pictures or diagrams more easily so the kids could see them and recall information better.
- The 2 week training really helped to see what the curriculum was all about and how to teach it. Working with other agricultural teachers was also very helpful. I asked the people taking the class with me a lot of questions.
- The ability to talk with a tech support at defined stem.
- The administration at my school was very supportive and so were my fellow staff members of the science department.
- The AEA was a good resource for mentorship, but they two were limited on time.
- The amount of support from administration and the willingness of other teachers to implement and use the program. Outside community help was great as well.
- The articles in the student book are good.
- The assessments were given to you and are prepared quite well.
- The AWIM training gave us an opportunity to network with others using this STEM curriculum. We were able to build upon and create new relationships with Area Education Agency staff. These relationships have opened new areas of partnering and support from the Area Education Agency.
- The AWIM training was effective in teaching how to use the kits, as well as meeting others who are implementing AWIM in their schools or organizations. As a result of the training and AWIM grant we have increased our work with the Area Education Agencies that service our counties. This opened doors of opportunity for partnering and a number of other areas as well.
- The AWIM training was great and the service provider very generous in knowledge, expertise and materials. I have a regular volunteer with the program who is an engineer and was able to impart his knowledge of what it actually means to be an engineer/the kinds of projects he gets to work with - this was a helpful addition and the kids enjoyed it. They also loved that the letters came from the toy company (I had the president of the toy company make a surprise visit!) The teaching guides were simple and easy to follow, which made my job of planning the program much easier. I provided some questions for volunteers to ask while the kids were working on their pinball machines/crash and bash sets - this helped with processing the activity.
- The AWIM training was great and the service provider very generous in knowledge, expertise and materials. I have a regular volunteer with the program who is an engineer and was able to impart his knowledge and experience of what it means to be an engineer and the kinds of projects he gets to work with - this was a helpful addition and the kids enjoyed it. They

also enjoyed the storyline of the material (that they were designing/improving a toy for a toy company). I ordered enough kits so that the kids could be 2-3 per group - this ensured a hands-on experience for everyone while still allowing us to work in teams and through the activities at once (preferable in an after school setting). We also were able to strengthen our partnership with the AEA during the Professional Development/training opportunities. Similarly, we were able to connect with local teachers implementing AWIM in their setting, which offers awareness of local STEM activity and potential for relationship-building and collaboration in the future.

- The AWIM training was very good. We got to see and use the materials offered which was very helpful in deciding which kits to order. The kits are very well organized and easy to use.
- The best thing was just knowing other people that had implemented the curriculum before and being able to contact them.
- The biggest help is having more materials, in my case that meant that I had more Lego robots to spread among my students. Smaller groups mean better students engagement.
- The binder include with the material was well organized.
- The book that came along with the program was wonderful.
- The Carolina Curriculum personnel did a great job communicating their openness to questions and willingness to help with any roadblocks.
- The CASE curriculum is some of the best content based and student driven that I have seen in 25 years of teaching.
- The CASE Equipment order form was very helpful in ordering correct equipment for the course. The administration is also very supportive of the CASE program.
- The CASE training was excellent, and of course required for teaching any of the CASE classes.
- The CASE Training was very helpful in providing a network to be able to work together and have resources and contacts once the year started.
- The CD.
- The class we had before implementing the program was fantastic. It really made it clear how the program would run for staff and what our expectations were.
- The day with PD. I would find it helpful to have a day with my specific kit to help implement it. Or even to have a video resource showing how a lesson looks in the classroom.
- The detail in the manuals.
- The directions and manual were easy to follow once I got going.
- The directions were clear.
- The district's science teachers presented some of the Defined STEM features to school board members who were impressed.
- The DVD of activities is great for planning. It really helps to see what the activities and products actually look like. Only addition I would like to see is an image on paper of what things look like (such as the crafts we will be making) for a quick reference during instruction.
- The ease of ordering.
- The Ecosystems Unit has a number of crucial steps regarding the care of live animals. It is important to plan ahead for these events. An example is that you will need about 40 liters of treated water three days before you start.
- The EiE kits are a fantastic curriculum. I wish we had the freedom to rent the EiE kits from GWAEA for $65 instead of paying over $200 for an EiE kit directly from the Museum of Science Boston. Both of these kits are single use and need to be restocked for the next year out of pocket. The GWAEA EiE kits have the exact same materials as the EiE kits from Boston.
- The EiE training was very beneficial before implementing in the classroom.
- The EiE training was very good. We got to do some activities right from the EiE curriculum which was great! Getting the hands-on time with the materials was very helpful!
- The first demo day when a rep came to our school.
- The free webinar provided by the Defined STEM team was wonderful. It was great to have the lady demonstrate how the website works.
- The guides for the kits were very helpful.
- The initial training from Carolina was very helpful.
- The initial training was very helpful in implementing the program. I also attended the science journals training and got some good ideas from that.
- The initial training where we had hands on access to the materials was helpful.
- The inquiry activities are great for hands on work.
- The instructions in the manual are wonderful. Going to the training made a world of difference. It helped me know what I wanted to do with my students and gave me some important background for carrying it out with the third graders.
- The instructions were clear and straight forward. (2 responses)
- The lesson planner was great and attending the Professional Development days were wonderful. The providers were great and easily contacted.
- The literature.
- The manuals were very helpful. I also found the materials to be very user friendly.
- The materials to implement the lesson were fantastic. I really liked the fact that I did not have to dig for materials to do the lesson.
- The materials were great!
- The materials were provided which was very helpful. The teacher manual was easy to read and use.
- The materials were student friendly. The rock samples were enough that all students could participate.
- The meeting that we had this summer.
- The network of instructors in Iowa to ask questions to.
- The note booking professional development was very helpful.
- The pictures in the manuals were excellent visuals as I taught these lessons.
- The plans they had laid out went very smoothly, the training workshop was well done, and we did not feel we needed any additional volunteer help.
- The PLTW training was well structured.
- The pre-planning I believe is the key to a more successful program. That is one of the reasons we fizzled out. We did not plan enough ahead of time.
- The professional development that was offered prior to us purchasing the products.
- The professional development training and the Carolina contacts were very helpful.
- The program was an excellent program, and materials were wonderful.
- The real life articles on how matter is used in the real world and the supplies for the experiments.
- The resources were nice to have. The worksheets worked well with the curriculum, it helped the students gain a better understanding.
- The rubrics are very helpful.
- The schedule and reading all of the things I need to prepare for the next lesson.
- The school we held the program in was extremely helpful and so were our volunteers.
- The STEM training I received was helpful.
- The student guides with reading passages were VERY good and the students were much more engaged than if I had used our very old and out-of-date textbooks for reading. I have some very low level readers and high level readers. The unit kept ALL my students engaged. The students LOVED using

microscopes and looking at live organisms and prepared slides. The teaching guide was wonderful because it explained what I needed to do for preps and projects.
- The students loved doing the investigations with the K-Nex. The lessons were well written and easy to follow.
- The students loved working with all of the materials and the hands-on approach. I liked how all of the materials were packaged and labeled and the extra reading material was interesting.
- The system is easy to use and the person who shared the system was engaging, knowledgeable, and made great connections to the Iowa Core.
- The teacher training is an essential key to implementing the STEM curriculum. Online resources were also helpful in implementing the AWIM curriculum.
- The teachers found the note-booking very helpful and informative.
- The teacher's manual was very user friendly.
- The teacher’s book was wonderful and explains things well. I found it hard not to help the students come up with solutions. The manual really was complete.
- The textbook provided for robotics and Alice was very helpful.
- The trained individuals were available for assistance, and provided great training for us to assist.
- The training and the guide for the project.
- The training at AEA11 in Johnston was very helpful before the beginning of the school year. It was helpful to see how this can be implemented at differing grade levels.
- The training beforehand was helpful.
- The training day was very helpful.
- The training days at AEA or elementary school buildings were very helpful.
- The training days were very helpful! I really enjoyed the Science Note booking Training.
- The training for CASE curriculum was very thorough and provided exposure to all aspects of the curriculum. I would suggest practicing labs prior to introducing the lab as well as planning labs for appropriate times of the year so that needed materials can be collected (ie. water and soil samples).
- The training I received was great help as we walked through some of the World in Motion activities.
- The training provided was very helpful.
- The training received during the summer prior to implementation was amazing! I really didn't have questions about the courses because the training was so thorough!
- The training session in Spencer really helped.
- The training session that we attended was very useful.
- The training session to build a world of motion geared car was very helpful.
- The training sessions were great!
- The training was a must!
- The training was a vital component to the success of these projects. I would have been lost without it.
- The training was excellent and would like it to be open to more than just the grant recipient or applicant
- The training was good and having the opportunity to network and share with others.
- The training was good. It got me excited about the EiE curriculum. When I actually started making decisions, it was very difficult to decide which I should choose as there was a great variety that could meet my needs.
- The training was very helpful. (2 responses)
- The training was very helpful. I really liked all of the materials. They were well-organized & everything was laid out in a quick and easy format.
- The training was very helpful. It would be helpful to have a follow-up training for the Automation and Robotics programming part. Maybe one day training just for that.
- The training we attended to offer this curriculum was absolutely outstanding. Everything from the facilities to the instructors was top notch.
- The training we had was very beneficial when it was time to implement with our class.
- The training we received was very helpful.
- The training we went to before we began the implementation process was wonderful and I also had three great teaching partners who were very open to doing the experiments and willing to help with any planning/teaching.
- The training workshop was very helpful in learning how to use the models in the kits.
- The training/PD was very helpful. I really liked the technology intro lesson as a start into the material. I also found it helpful to partner with an engineer to explain to the kids what engineering is like and what he does day-to-day. I would recommend this material for day camps and in-school settings as it is all very high quality and has a great, intuitive foundation to guide students through (Engineering Design Process). The EDP teaches much more than design - it teaches critical thinking skills, problem-solving, team work and many more life skills that can be applied to just about anything. We were able to strengthen our partnership with the AEA during the Professional Development/training opportunities. Similarly, we were able to connect with local teachers implementing EiE in their setting, which offers awareness of local STEM activity and potential for relationship-building and collaboration in the future.
- The two hands-on training and the Notebook training as well.
- The two week training on how to how CASE.
- The variety of mentors we had from both of the businesses we worked with were fantastic. They brought such a wide range of talents to the table, and we were always able to seek help from them when we needed it, even if it was outside of their regularly scheduled day at our school.
- The webinar.
- The website was helpful.
- The workshop at the beginning was helpful.
- This program allowed me to connect to the health care providers in our area. This will allow me to make connections next year to continue to expose my students to possible career paths.
- This would be an amazing kit for Middle School where you teach more than 1 section each day and for a larger chunk of time. The students were very motivated but just were always rushed.
- Timely arrival of materials.
- To allow the students to talk about their project at each meeting. The students enjoyed talking about their new bird or decorated feather in front of the other students.
- To keep the black little plug on the inside. If it is outside it tends to get knocked off easily.
- Training.
- Training and paid workshop time to implement is helpful and maybe even essential to do the new STEM curriculum justice.
- Training and teaching partners.
- Training during the first year of implementation.
- Training for the Carolina Lab Modules is very thorough. I emailed or called when I had questions and worked through obstacles. It is something you need to immerse yourself in & give enough time and attention to really enhance student learning. It is worth the work a teacher puts into it!
- Training opportunities were very beneficial.
- Training provided by STEM Coordinator.
- Training was helpful. I think booster training sessions would be helpful. The DM and AR software packages are intense.
- Training was useful and materials easy to use.
- Training!

- Training, administrative support.
- Try to schedule make up dates, so you can make it through the curriculum.
- Trying the experiments before doing them with the students! This helped us determine how to group our students and which ones would be too hard for the younger ones to accomplish on their own.
- Use the rubrics and the materials already supplied for you.
- Using other ag teachers to ask questions on curriculum and lesson procedures. Work with science teachers in your school to help with science or lab related concerns or materials.
- Using the local college-Northwestern College in Orange City
- Very helpful to have another 8th grade teacher to collaborate with.
- Was helpful to have a university student assist students in posing questions and furthering thinking.
- We enjoyed the 4 different areas. I had a volunteer who helped with the Engineering with Nature. She has taught agriculture and also has a masters in this area.
- We had a great workshop on making and using Science notebooks in class.
- We had a great workshop on using the data notebooks and making and using science notebooks in class.
- We had a person start a Facebook page of those that attended summer training together and that helped several times when there were questions.
- We had a professional development geared towards the Stem training and after that I knew what to look for.
- We had an engineer that assisted us when needed. My administrators were fantastic in getting me any resources I needed and helping me by changing the master schedule to accommodate the time I needed to meet our goals. My administration also paid me for my training which was fantastic.
- We had wonderful administrative support. Our school administration provided additional personnel to provide supervision and guidance at the cost of our school district. If the teacher leader needed to be released from the building for activities for the club, the school provided substitutes and covered the costs.
- We have a Promethean board in both of our rooms, so we both made a flipchart and also an extra student journal that went along with the instructions. This was helpful to give us a place to write all of our findings down, as well as providing the students with a science journal.
- We have been working in the community for a couple years now and I found that because of that we had an easier time with our service project and working with professions in their respected careers.
- We have great volunteers (engineering and marketing) that come in to facilitate, and I work with three other teachers to make this cross curricular.
- We partnered with a local landscaping business. They were very helpful in teaching us more about how to care for the plants.
- We put our students into groups and had teachers teach the same activity to each group for each session. This worked well.
- We regularly collaborated with our grade level teachers in preparations for these lessons. This was a great opportunity to prepare for upcoming lessons and avoid challenges. The STEM training was also very helpful.
- We spent a great deal of time going through the materials when they arrived and organizing them to make it easier to find what we needed. You do need a large amount of space in the classroom and in a storage area to handle all of the materials you will be using and needing. The binder was very helpful in implementing the lessons each day. Preparing a head of time is a must when using a kit like this.
- We used our scale up (this years and last years) as part of a district-wide STEM Expo (engineering competition). We had a tremendous turnout and high levels of enthusiasm (from parents and students).
- We watch videos of past gravity cruiser competitions.
- We went to another school for their PD time spent on this program and getting that time was VERY helpful. It needs to be scheduled time to learn the program.
- We were able to complete on our own.
- We were able to partner with some local high schools and colleges and take advantage of engineering and robotics students who served as mentors to the girls as they worked on the design and redesign stages. This was especially helpful since the girls were able to have a role model who could reinforce ideas like learning from your mistakes and trying everything because you never know what might work. This is sometimes a hard lesson for our parent volunteers who tend to want to do it right the first time and tend to guide the girls rather than let them learn by doing.
- We were able to work as a grade level team to map out implementation of the kits. There were 5 teachers teaching the kits.
- We worked with a pilot the last day. I wished that I had invited him to our room earlier. He answered many of the questions that the girls had about flight. He even offered to take the girls for a plane ride in his small plane. We were disappointed when our insurance company said NO. We are now looking at going to the hanger and seeing and sitting on the inside of the plane.
- Web link to Carolina!
- Webinar.
- Well thought out questioning. Pintables were easy for the kids to follow. The story's illustrations were hard to get excited about.
- Well written teacher guide.
- Well, my binder and kit resources were VERY helpful. I will plan ahead with collecting, cleaning, marking and cutting of the bottles. I will also probably use sections of panty hose for covering the terrarium with the lids being taken on and off. We had a lot of screen breakage. My students also understand the importance of never leaving eco-columns unattended or unstable. They have become more detailed in their labeling, organization and details!
- What was VERY helpful was the training sessions for AWIM: the facilitator was knowledgeable and very helpful!
- When grouping the children have an adult with each group to facilitate students learning.
- When grouping the children have an adult with every group to facilitate student learning.
- Work together as a grade level team.
- Working with other teachers, great resources once you find your way.
- Working with teams to discuss upcoming lessons, co-teaching
- Working with the other CASE instructors in answering question and helping others.
- You just have to keep trying different providers until you find one you like.

Appendix P: Regional Scale-Up Program_Open-ended responses related to outcomes of Scale-Up programs

Prepared by Research Institute for Studies in Education (RISE), Iowa State University

Descriptions of school-business partnerships used most for your Scale-Up program

(e.g., type of business, any activities that were the result of the partnership, successes/challenges/barriers of the partnership)

- 3-M presented 3 times this year to the 3-5 grade classes.
- 5 Seasons is an after school program- I have been working with them to provide staff development to support them meeting DHS Licensing requirements for 15 years. The program (5 Seasons) is in partnership with the Cedar Rapids School System and St. Luke's Hospitals (now Unity Choice).
- A design engineer from a local industrial plant was a guest speaker. It was hard to schedule a time.
- A visitor from a zoo came to talk about animals with the students.
- ADM Desoto Intermediate School was my partner for an afterschool program and a teacher/guidance counselor was my partner; I partnered with Perry Child Development Center to deliver spring break activities to their school age youth.
- Adult guidance. (2 responses)
- AEA.
- After the unit I invited an engineer from a neighboring community to come in and talk to the 4th graders about his job.
- Agriculture businesses and foundation.
- Alcoa provided an engineer to talk to the students about the new contract that they received in January from Ford and what that entailed for the field of engineering at Alcoa. In addition, she spoke about her role in engineering at Alcoa. Also, she spoke about the Engineering Design Experience and how engineers solve daily problems as a team in a collaborative fashion. Excellent PowerPoint about the factory and the aluminum it produces.
- Alcoa-aluminum products. I had two young engineers come in as guest speakers. They are willing to come again next year and may be able to come more than just once as guest speakers. They only down side was that they only had about 20 -25 min to speak with each group. (I used them for both my 3rd grade stem-swim and 4th grade stem -AWIM.
- An engineer came to help with the STEM activities and he spoke to the students about how his job was like our activities.
- At parent -teacher conferences, I had a parent express interest that they would come in. It did not work out during our STEM time. They were unable to come in.
- At this time we have been using this group for ideas that can be used in the classroom and they have been there for support. The biggest item was to establish the opportunity of having guest speakers and field trips.
- Bano and Principal - guest speakers.
- Barrier to the partnership comes from our geographical location being very rural.
- Berkley Technology Services allowed 5 professionals to come to our school for after school programming and during school to speak with our talented and gifted group. They invited us to their company for a tour, and they would often Skype us in specialty areas. Adam helped our cyber team. Ryan and Tricia helped our robotics, Gopi helped our gaming, and Kelsey helped our multi-media team on various occasions.

- Berkley Technology Services from Urbandale, IA- IT-Expo in Ames-came to club about 7 times-and invited us to their company; Prometheus Awards night in Des Moines, DMACC came down to visit- (Silas Hanneman, Silas W <swhanneman@dmacc.edu>, and Tripp, Teresa" <tmtripp1@dmacc.edu- They spoke to 15 students about STEM opportunities.
- Blank Park Zoo came and gave a presentation with a guest speaker.
- Cargill was easy to work with and were willing to answer my questions. They helped to fund school STEM projects.
- Classroom time was severely limited in order to ensure all students could take the course. During the first year the focus was on content. Next year there is more time for the classes, so more partnerships will be pursued.
- Country Haven Residential Care Facility offered my club space for meetings and practice as well as aided in allowing some of their employees to volunteer as mentors and chaperons for my club students.
- Des Moines University Medical College and Mason City Fire & rescue come to the school and conducted an in-service for my students. NIACC show cased various career options for the medical field, students went to campus for this. 20 students were given the opportunity to tour the Mercy Medical Center for a day.
- Dowling Catholic High School.
- Due to the Scale-Up program, Mary Cooper from Ostrander's Greenhouse spoke to the class about propagation methods. We will also be visiting Ostrander's this spring to learn about their business practices and how they maintain their greenhouses. The Plant Science class planted trees and maintained flower beds at the American Gothic House with the City Council of Eldon and the Iowa Trees Forever.
- Eastern Iowa Light and Power came and gave an electricity safety demonstration. I also have a partnership with Alliant Energy with their Energy Wise program. It allows students to take home a kit that gets them thinking about the electricity/water they can save within their home.
- Engineer that spoke to my classes.
- EZ Way Inc. make lifts for hospitals / Field trip / very informative for the students - showed and demonstrated machines and engineer drawings / Engineer speaker.
- FBL Financial provided many mentors for our program as well as field trips for our students. Hy-Vee has also become involved with our program by offering career talks for our students at their corporate headquarters. Other personal contacts were used as career speakers for our students.
- Field trips to a local farm equipment manufacturing company. Future field trips to an electric paneling shop.
- Field trips, guest speakers.
- Field trips, on line resources used in classroom.
- General Dynamics Information Technology partnered with Visionary Services, Inc. to facilitate club technology activities (e.g., cyber defense, robotics, graphic design, and web development), career showcases (from real life professionals across the Des Moines area), participation in the IT Olympics, and virtual spotlights from companies such as godaddy.com.
- Gilbert is close to Ames which is the home of Iowa State University. We use more professors than "businesses" in the class. One parent came in to help, as a retired person, he is a geologist and gave valuable information about earthquake seismogram readings and some help with the volcanic rocks we looked at.
- Girl Scouts uses community partnerships to be our experts on STEM as well as the other focus areas that we determine are important for girls. For our Scale-Up A World in Motion program this past year, we relied on a number of community partners to be our expert in STEM and engineering. As mentioned earlier, our partnership with local high schools and colleges was the most beneficial relationship. The schools provided volunteers to help mentor and implement the program as well as professors who served as experts. One of our events was sponsored by the science department at the University of Dubuque and took place on their campus.
- Grants from agricultural businesses, guest speakers from area businesses.
- Guest speaker. (10 responses)

- Have partnered with the Nishnabotna Valley YMCA. They provided a staff person who taught AWIM. The YMCA marketed AWIM and recruited youth to attend. Have helped promote other STEM opportunities.
- Homeschool / Existing afterschool club (Clover Kids K-3).
- Homeschool Assistance and Muscatine County 4-H.
- Hy-Vee mentors.
- I am working with trying to form a partnership with the farm bureau.
- I became familiar with our local Crop Production Services agronomy business in my search for consumable materials for this curriculum.
- I coordinated with an engineer from John Deere who came in and worked with students on their designs and talked to groups about the real-world application of the skills they were learning in this project.
- I did not use any this year. I did discuss my husband's job in the environmental engineering field.
- I had a geologist from the Hallett company come and speak to the kids and we also went out to a gravel pit for a field trip.
- I had a professor come in to ask questions as we began our re-design phases.
- I have a lot of ideas/plans for ways to bring in local conservation/ naturalists. We could also travel to local ponds and parks. It was truly jam packed learning for us this year.
- I have found from our existing partnerships student who go on tours and hear guest speakers more readily relate to the jobs that are in the agriculture industry.
- I have not used any business partnerships this year but am still looking for opportunities for my on-going Carolina Kits that I am implementing.
- I haven't established new partnerships but we do have a good working relationship with Mobile Track Solutions which manufactures materials for tracked vehicles.
- I hope that the school-business partnerships can be jump started next year for our GTT program at Vernon Middle School. We will be implementing the appropriate schedule, so more time will be allowed for partnership activities.
- I now have a mentor that is an IT Director at a trucking/shipping business in town. / The students went on a field trip to John Deere in Des Moines and Spindustry also in Des Moines. The service provider set these up for me. The students LOVED the experience.
- I partnered with the local library to conduct EiE programming. The local school was used to bus the kids after school.
- I presented to several community groups but we have not yet established a partnership program. It is difficult to teach and build an effective program and then also try to create a partnership team, etc. I really need some help in this area and with my administrator being new to our building this year, he hasn't really had the time yet to help within this area. He has been a big help but this is an area where we still need to improve.
- I tried to set up a visit from our horticulturist in the county, but the time required for the activities did not make it feasible in the afterschool set-up.
- I utilized a few field trips and a few guest speakers in my STEM Scale Up program.
- I visited with Iowa Extension, Monsanto, Cargill, and ConAgra.
- I wouldn't say it was necessarily a school-business partnership, but a partnership with a local community member, who is an engineer for a specific engineering company in a neighboring county. He came in to speak with students about general engineering and also to show some of the work he does.
- IBM- the biggest challenges were communication and scheduling. We finally met with our partnership people in January. Due to school schedules and personal schedules it was a little challenging. Now that I have contact people, I can hopefully continue with them next year.
- Industry.
- Invited Palmer Candy, Sue Bee Honey, Cargill and Jolly Time popcorn to be guest speakers and answer questions from students. We are working on this for the end of May. I will try to get this started earlier in the

year next year. I wanted to work through EiE first before inviting the chemical engineers into the classroom this year as it was our 1st time implementing EiE.

- Iowa State Extension Office- Kendra Crooks.
- Iowa State University, guest instructor - instruction on forces, torque, speed, gear ratios. Popp Engineering, guest speaker - engineering and design process.
- ISU Extension and Outreach in Clinton County partnered with Camanche Elementary School to implement this program. All marketing was done through the school. The school also provided the facility and additional resources for students.
- It was hard finding a time that worked for both of us.
- Jim Black was a guest speaker and helper while implementing the pinballs.
- John Deere ISG - job shadows, mentoring, field trip. Successes include winning competition challenges at the IT Olympics, 7 girls and instructor recognized by National Center for Women & Information Technology Aspirations Award Winners.
- Local agriculture companies were great partners for information, as well as equipment needs.
- Local Engineer helped describe to students all the different types of engineering they could get involved in.
- Local guest speakers from local businesses that we purchased materials from for growing plants.
- Local manufacturing company; field trips and guest speakers, as well as help with implementation of some of the activities that we have used. I had only had positive comments and situations in dealing with the business.
- Manufacturer - visited this business to see how they use chemicals in their business. Cost of transportation there was a little concern with administration. But it all worked out.
- Manufacturing.
- Marketing materials distributed to students.
- Mentors from John Deere and IBM came once a week to work with students on programming in ALICE and working with the NXT robots. They did some brief career talks throughout the semester to introduce the students to a variety of STEM careers. The only challenge was we didn't have as much time as we would have liked to work with each group.
- Midwest Industries Inc. (manufacturer of Shorelander Boat Trailers/Lifts) and Jon Devitt (VP of Engineering at Midwest).
- Mr, Windt, a retired aeronautical engineer, helps with the STEM kit from last year (AWIM).
- My administrator is working to develop some school-business partnerships.
- My class walked to the high school to release the butterflies in the FFA greenhouse.
- My scale-up program did not have a school business partnership as it was self-contained Carolina STEM curriculum. (Land and Water kit)
- Nick Rissman the Howard County Engineer
- None. (26 responses)
- One of the schools was interested in utilizing the program throughout the elementary.
- Our 4-H program is just starting directional STEM programming with afterschool students, so our partnerships are young. However, parents are promoting our Engineering is Elementary programming and I believe new partners will not be difficult to find next school year. We are already having businesses asking to help this summer. This school year, we have not visited any businesses due to the age of the students, but we discuss frequently the businesses that parents have and how they tie into our Engineering process and future career choices. We have many partnerships with non-profits.
- Our business helped us with multi-media. He made trips up here and viewed our items on line.
- Our community partner is a local contractor. He came to speak with our students twice this year. He talked about how different tools that he uses were designed to "solve a problem". He talked to our students about how he uses STEM skills every day in his work. Students have referred to things he talked about all throughout the year. He is a great partner!

- Our HyperStream relationship with Principal Financial Group provides our students with coaches, guest speakers, and field trips. Early in the school year, professionals from different disciplines come to our school and explain their career role to the students through mini breakout sessions. Students then pick the role that interests them the most. The next step is to create teams of the different roles for an IT Olympics project. Teams are then assigned coaches (one for the speakers) who provide them with feedback once a week.
- People in the field natural resources field came to the class to assist with classroom activities that were conducted outside. We were able to supplement book and computer references with "people" references....guests' speakers were able to share their technical knowledge with the students as they conducted their outdoor classroom activities.
- Pinter's Landscaping donated plants and provided us with additional knowledge about caring for the plants.
- Post Equipment and Valley Machining Company have served as the major partner for the Mad Scientist 4-H Club and their AWIM activities. They give support through volunteers and supplies. Their practical application of the concepts have helped youth see themselves as successful learners and created awareness of career opportunities. Tours of the companies gave youth a clear idea of what those careers might involve.
- Principal Financial - first one volunteer, then he brought 1-2 others to subsequent Club meetings. Helped with Lego robot programming and debugging of programs. A volunteer from NIACC helped the students with digital photography and editing photographs for the web page.
- Proctor and Gamble gave generous financial support to fund additional needs in our PLTW program.
- Project Managers to advise students on setting goals and meeting them.
- Regional PLTW committee.
- Rockwell Collins engineer.
- Rosenboom cylinders, we are still working to see if the partnership will work. It is still in the deciding process.
- SENSR in Elkader was a willing partner, but we never were able to coordinate schedules. Keystone AEA did provide a great volunteer mentor to help with some projects.
- Shazam - local programming/business that has partnered with me in the past. I have a volunteer that comes out once a week to work with students. Shazam comes and speaks in my classroom each year and I have had students participate in internships with them. Wellmark BC/BS - I had 2 mentors come to work with our cyber defense team. They met every week starting in January. All wish to continue next year.
- Southwest Regional Water District came and showed a power point about how they use science, technology, engineering, and mathematics in their business. We also took a field trip to their pump station, water tower, and new water tower site. When we visited our current class sponsor, KMA radio, we talked about how they use STEM in their profession. I have found a way to bring STEM into almost every subject area in my class.
- Southwest Regional Water District, a water system providing water to small towns and rural customers. The manager gave a power point presentation and answered questions about the business, showed engineering plans for a new water tower site and extension to the system, shared information about adding chlorine to the water, and showed the technology used to monitor the pumps. We also took a field trip to the water tower, the pump station, and the new water tower site.
- Speakers who were involved in marketing and sales talked to students about marketing their cars and designing campaigns. Car dealers and mechanics offered ideas during design and building phase.
- Students took a field trip to our local business partner.
- Sudenga Industries IT came to each meeting and provided guidance to students.
- Telligen provided three of their employees to our club and they attended our meetings regularly and worked side-by-side with our students helping them and guiding them. One of the Telligen employees spent portions of three meetings walking the students through the life-cycle of "app creation" so that students could try doing this on their own. Telligen has been a great partner!
- Ten of the volunteers are engineers or have retired from John Deere, one volunteer is an engineer and owner of One3Design, one is from Wheaton Fransican Healthcare, and one from University of Northern Iowa, and three are community business individuals. We had a display for E-Week at John Deere in February, a ProE

demonstration and work with One3Design, and will be taking a tour at One3Design to see a tractor transmission.

- The Carolina Plate Tectonics curriculum STEM program does not require a school-business partnership. I have signed up for the Powerful Partnerships in STEM class for graduate credit. This is a new course and I am excited to partner with a business to help with the KidWind/Wind Energy STEM program I used for the first time last year.
- The City of Fort Dodge was helpful in providing us real information and in understanding current issues.
- The Davenport Community School District has business partners for the PLTW program. I, however, did not access them.
- The FFA chapter also paid for additional supplies needed for some of the labs.
- The material I taught this past year did not require any partnerships. However, I will be looking to add them in the future.
- The Nevada Community Resource Center housed the after-school program for us. They provided us with participants (they contacted their eligible participants and encouraged them to join the program). The Resource Center was responsible for getting the kids from the school to the program and provided snack and any assistance we needed.
- The partnership that we used most was with Dordt College and, in particular, Dordt College's Engineering Dept. This was our third year hosting STEM Fest in partnership with Dordt College - close to 150 area middle schoolers attend and rotate through sessions surrounding STEM topics. We were able to use our EiE material in that setting, which offered STEM education as well as significant career exploration activities. In addition to that, the Lab Systems Engineer at Dordt College was a volunteer with the Discover 4-H after school program and EiE program in Sioux Center. He has been able to talk with the kids about what it means to be an engineer (career exploration for a younger age group).
- The program did not require a business partnership.
- The Scale-Up Program has been supported by areas business and community supporters. These were each new due to our program being of new existence. Individual community supporters financially contributed to our ability to possess adequate tools and equipment for implementation of the curriculum. Speakers were present from local agricultural business as well as the USDA. Additionally these community business partners provided a agricultural engineering and manufacturing field trip at the end of the school year that benefitted students who were a part of the Scale-Up program.
- The school the STEM after school program was held in partnered with us by providing any help we needed, i.e., lecturn, ladders, refrigerators to house snacks in, globes, etc. The school was wonderful to work with and there were no barriers.
- This is my first year and I didn't use any of my partners except to present to them what I was doing. I have some great ideas for next year and will be using my resources better now that I feel more confident in the program.
- This is something we are continuing to work on. We are in a very small, rural community and need to find some business partnerships. We have a couple possibilities, just need to finish up.
- This year we were not allowed to use STEM funds for STEM field trips. In the previous 4 years I used STEM funds to send students to the following STEM Field trips: UI College of Engineering, UI MIni Medical School, UI Geology Dept., UI Chemistry Dept., State Archeologist Dept., UI Natural History Museum, UI Biology Dept. Botany Greenhouse, UI Macbride School of the Wild Environmental Center, UI Macbride Raptor Center, Kent Park Environmental Ed. Center, Iowa City Children's Museum, Putnam Museum, Mississippi River Museum. These STEM field trips were wonderful opportunities for students to see adults/college students engaged in science careers at their worksites. It was a disappointment to not be allowed to use STEM funds for these trips this year. It made the kids see how exciting engineering and science careers could be.
- Two engineers from ALCOA came to talk to the students about how they use the Design Process in their jobs.
- Two individuals from Fisher Controls/Emerson were our ambassador/mentors for HyperStream 4-H Club. They were good and youth responded well to them, but they lacked experience working with middle school

youth. They choose to meet once a week every week afterschool during the school year. They introduced the members to Arduinos and Blender. They also worked with robotics.

- Two individuals from Global Reach, a web design company, were our ambassador/mentors for HyperStream. They were good and youth responded well to them, but they lacked experience working with middle school youth. They knew web design well, but had to learn robotics as they went along. A parent of two of the 4-H members works at Fareway Distribution Center in Boone. He arranged a tour of the center to see technology at work in the work place. It was very interesting.
- Unity Point LifeGuard / Grundy County Memorial Hospital- 8 different departments / Parkersburg EMS / Grundy Center EMS / Des Moines University- provided 8 different professionals from al practices in medicine including professors. / Experience Health LLC.
- Used the school library. Advertised through the schools. Secretary collected registrations for me.
- We are going on a Field Trip to the Putnum Museum in Davenport, IA. They are having a STEM week for students to participate in.
- We are just in the beginning stages of working with Polaris Industries. Our high school already works with Polaris. I'd like to create a direct link to them with our middle school program as well. We did take our 8th graders to Polaris on a field trip.
- We are still working to get a school-business partnership set up. We have a couple leads on some businesses/partners so hopefully that will be set up right from the start of the school year next year. We will spend some time inviting them into our classroom and show them what we are learning about.
- We did schedule a PEERS program, but was not able to make it happen during our unit. We did contact a linesman apprentice program to come and talk about electrical careers, but that didn't happen either.
- We did visit ISU for their computer-engineering day.
- We didn't use our business partners for STEM this year. We used them to show our students that adults have to use the 6 pillars of character in their work setting.
- We formed a partnership with Buena Vista University that will give us the opportunity to have some of their students mentor our students going forward.
- We had a consulting engineer to contact and help.
- We had a guest speaker come in to talk about soils judging and I would get my plant supplies from Earl May.
- We had a local engineer who has an engineering business in Sioux City come to talk with our students about all careers involving engineering. I have utilized a local car restoration company that uses 3-D printers to make parts he can't find for the foreign sports cars. He has also shared with us what their engineers do.
- We had a parent volunteer who works at NSK here in Clarinda, Iowa. He was our guest speaker a week before we implemented the program so the students could listen to how STEM is incorporated in the work world. The students loved having an opportunity to discuss topics that involved STEM. When we implemented the program our parent volunteer came back and worked with a couple of the classes.
- We had a quest professor from Wisconsin come and help us build a 3d printer to be used to print the stuff the students create in Design & Modeling. We had a computer tech person (outside of the school) help set up our programs on the computers.
- We had help from fabricators and engineers at Puck Custom Enterprises in Manning.
- We had multiple speakers from Iowa Lakes Community College, the instructors shared about their area of research/ class such as wind technology and criminal investigations. We had many good comments from the participants and felt they were a success.
- We had numerous guest speakers into the classroom to help students make connections from classroom activities to real life situations.
- We had the County Extension Office come and speak to both the students and parents at our final day of camp.
- We have a community partner that has come to speak to our students twice this year. He's a contractor and has talked about how he uses STEM skills every day in his work. Different times throughout the year one of the students has made reference to something he said and how it relates to what we are working on which is great!

- We have a partnership with Ellison Technologies Automation of Council Bluffs. They have provided tours and video footage of robotics applications that they have developed.
- We have a partnership with Source Allies in Des Moines. They are a technology based Co. providing IT and now creating new ways to incorporate technology to better use resources in other companies/things.
- We have Geaters Machining and Manufacturing and Wieland and Sons lumber company in our CTE committee.
- We hope to partner with The Fruited Plain Coffee Shop and Blue Mountain Emporium and other local restaurants that use local foods. We will invite their chef to speak to the group and share how they plan their menu to feature local foods.
- We introduced guest speakers, facilitated live stream visits from guest companies, and showcased career spotlights which were very helpful for the students to understand STEM fields and real-life professions.
- We mainly partnered with the Spencer Schools System to use their facility and we use ISU Curriculum for Clover Kids.
- We partner with Rockwell Collins for many of our programs such as Lego League and STEM. I had contacted Kim at the end of last year to have engineers come in, but she moved on to a different job and I was not able to arrange a speaker with her replacement.
- We partnered with Dordt College's Engineering Dept. and had their Lab Systems Engineer, who has become a more regular volunteer, talk with the kids about engineering (he also showed up to the after school program as the president of the toy company in the curriculum). This has strengthened an already-established partnership with the Engineering Department and Dordt College as a whole, a partnership that has meant a lot to Extension and to STEM programming in the last several years. I also believe that this volunteer-youth interaction has led to the kids being exposed to the field of engineering and has allowed them to gather a concept of what higher education looks like.
- We partnered with Dordt College's Engineering Dept. and had their Lab Systems Engineer, who has become a more regular volunteer, talk with the kids about engineering and the types of projects he gets to work with. This has strengthened an already established partnership with the Engineering Department and Dordt College as a whole.
- We partnered with the Boone Area Chamber of Commerce for an Agriculture STEM Career Tour and visited three local businesses to explore careers in agriculture with a STEM focus. Students got to see hands-on, real world careers in action and see the science of agriculture applied in different scenarios.
- We partnered with the local Farmer's Cooperative to conduct a feed trial on poultry. This trial is an outgrowth of the animal science unit of the AFNR curriculum. The partnership allowed for hands on data collection, public reporting, and exposure to careers in animal science.
- We partnered with the two schools to use their facilities as we have done in the past. / We also partnered with the county conservation naturalist and had her come in share educational information on the animals with the kids at almost every meeting.
- We took a field trip to Monsanto and Mid-American Energy's Big Sand Mound with the Louisa County Conservation Board to further explore ecosystems, pollution, habitats, and more.
- We tried to get a local engineer to help us last year with our Jet Toy Challenge. After many phone calls, I gave up and decided that they were not coming. This year we had one of our dads who was also a pilot of a small plane work with the sixth grade girls and share his knowledge of flying. We learned a great deal from him.
- We used one of the community schools as a host site for Clover Kids so students could join us right after school without having to leave.
- We used some community business for extended learning purposes. We went on field trips and also invited in guest speakers to help us understand the material a little bit better.
- We used the Rockwell engineer that has been in my room before to help us with the AWIM program. We also went to the Indian Creek Nature Center, the Mercy Medical Center, and had a visitor from the Cedar Rapids Airport.

- We utilized our local STEM program, which has many partners to fund and support STEM activities. Here is a link: https://sites.google.com/a/thegenerals.org/sibley-stem/.
- We visited the server rooms of the public school and bank. Due to family issues the school-business mentor was not able to assist us during the school year.
- We went to a STEM Conference at Iowa State University. We hosted and worked with VEX also to enhance our programming skills.
- We were able to build a greenhouse for the first time in school history. In our greenhouse we raise vegetable plants to donate to the local food pantry. We are also working with local communities to grow community hanging baskets to beautify the towns.
- We work with community businesses to create websites and commercial ads for them. They come in and speak with us as well as the students being allowed to leave during that time to attend meeting with the business about the project. This has really helped my students learn more about the business world and the proper ways to act when in meetings and talking with the working adult. Their final projects have to be up to par with what a business would expect from a marketing team, so they become more detailed oriented as well.
- We worked with 5 engineers from John Deere which came to the classroom through various parts of the unit. These individuals helped focus the units on "real world" settings and how the content information could be utilized within various professions.
- We worked with the Camp in a Can trainers to help us learn more about each experiment to successfully implement our Scale-Up program.
- Worked with local DNR agency guest speaker.
- Zoo visit in the future.

Did the outcomes meet your expectations? Why or why not?_Yes

- 20% increase on Iowa Assessments over last year WOW!
- A good way to have students use science and math skills outside of the normal scope of their traditional use.
- A Slick Solution tied in with our school's curriculum.
- Although many of the students were skeptical at first, most of them ended up really enjoying the program.
- As of right now, students have improved grades in math and science and they are showing problem solving skills through STEM activities.
- Awareness of STEM from my 4th Graders.
- AWIM allows youth learn and practice science and math skills. The opportunity for independent learning as well as team learning creates a less threatening learning environment.
- Basic principles became clearer to the students as they conducted experiments & decided upon changes to be made.
- Better understanding observed formally and informally.
- By the increasing of the critical thinking skills.
- By tying to the Core Curriculum.
- Career awareness for all engineering careers.
- Cars traveled farther with modifications.
- CASE lived up to expectations.
- Children had fun while learning about STEM topics.
- Completed projects, research techniques, working with software, working as a team member.
- Connecting the labs to real life or real world concepts.
- Ease of use and vast resource availability.
- Easy access to lesson plans, rubrics and videos.
- Easy to follow and got the students excited about learning.
- Engaged science unit; new vocabulary, scientific observations & questioning.
- Engaged students and was meaningful. Students love SCIENCE!!
- Engaging labs.
- Even though we are not completely finished with the unit as of date, my first graders and I are enjoying the different stages our caterpillars are going through.
- Everyone was fully engaged most of the time. They were always eager to participate I am not sure if they learned anything new, but what they already knew was reinforced in the various activities they performed.
- Exceeded my expectations!! I have 60 out of 61 students proficient in Science this year on their Iowa Assessment scores, which is way up over last year without STEM!
- Exceeded our expectations. It's been a remarkable experience watching the students explore technology and experience the direct impact of technology on their lives and career interests.
- Excellent opportunities for students to experience the Engineering Design Experience.
- Exposed kids to new material.
- For students who used Defined STEM, they were able to understand STEM concepts to a far greater capacity.
- For the age group we were working with, it was a great opportunity to gauge their retention and learning.
- For the amount of training that was provided to the staff for the Carolina kits.
- Gaining knowledge and opportunity for hands on learning.
- Girl Scouts has 15 short term outcomes that we try to achieve through our programing. This program was ideal in achieving those goals that are aligned with STEM. The outcomes that we were most happy to see girls achieving were -Girls develop critical thinking skills, - Girls are resourceful problem solvers and - Girls seek challenges in the world.
- Great discussions about chemical reactions!
- Great discussions and higher order thinking.
- Great engagement activity.
- Great supplies and materials to use.
- Greatly increase student interest and achievement in the subjects.
- Hands on material are great for the kids. I knew that working with the stream tables would increase their excitement and knowledge.
- Hard working kids who enjoyed learning in a hands on fashion.
- Having everything together in one box with all the curriculum was great! Even when it would get crazy, I felt organized.
- Having the children learning new things and being excited about knowing the answers. Watching them share their knowledge with others.
- Having the materials to set up experiments so that students are learning the concepts is amazing!

- Helped me become a better teacher and helped students learn better.
- Helped us fulfil the core education on wave and wave technology.
- Hoping students were to be shown opportunities and want to succeed in areas of interest.
- I am very happy with the curriculum and what it has allowed me to provide my students.
- I believe the students understand what it means to inquire about something however I think I could make the experience a little more effective by using science journals a little more.
- I believe they will meet expectations.
- I did not know what to expect starting out this year.
- I do experiments in science with all my units, so I knew the students would like STEM.
- I enjoyed seeing my students get challenged and never be satisfied with their initial plans.
- I expect students to learn new content and to practice the skills of a scientist. They accomplished both of these goals.
- I expected more students and adults to be inspired by STEM.
- I expected students to enjoy building with the materials.
- I expected that since I had more time to plan the activities and less time was needed in writing worthwhile curriculum, there was more time for actual student learning to take place.
- I expected the kids to enjoy and learn.
- I expected this program to beef-up my curriculum and provide experiential activities for my students to be able to visualize the concepts they needed to learn in chemistry.
- I feel that in general, all of my students enjoyed the GTT training. They all gained general knowledge of the engineering field and were successful with the technologies involved.
- I found it easier to implement than I thought.
- I gained some more girls this year and hope to continue getting female involvement in my programs.
- I had more student involvement than before or with some other things I have done in the past.
- I have been pleased with the engagement and connections that students have made through Eie. The chemical engineering aligned well with 2nd grade CORE math graphing and data collection, Social Studies economics (product research).
- I have had many students participate in a nontraditional subject at school and enjoy it!
- I have the materials to help develop the lesson plan that is STEM based. We aren't finished with the activities yet so I can't comment on student expectations.
- I have worked with this program before and several students do have an increase sense or awareness of STEM as a result.
- I knew students would acquire new vocabulary & become much more curious. They also gained much skill in the inquiry process and became better risk-takers in predicting and investigating.
- I knew the students would enjoy their experiments with World in Motion.
- I knew the students would like the courses.
- I love the application part of the curriculum. Applies to everyday life.
- I loved to just step back and watch them create! Trial and error is so important in the STEM projects. At times they were just like little kids playing, however, they were learning so much!
- I needed an easy well organized program while our regular programmer was on maternity leave.
- I saw students ask to learn more in the venue they chose to participate beyond what was expected.
- I thought it was a good program and the students enjoyed the activities.
- I thought students would be engaged in the learning tasks and feel good when their perseverance paid off by having their projects work.
- I thought the content was enjoyable enough to draw the kids' interest. As it did!
- I thought they would be very interested and they were.
- I thought this program would create excitement among students.
- I wanted my students to learn about team work, finishing a set goal, what it's like to try, try again, and to have fun! ALL my expectations were met and then some!
- I wanted students to see the various activities/careers associated with STEM and that they could be a part of that world - it is not out of their reach.
- I wanted the students to become more aware of STEM careers out there and I think they are starting to see all the opportunities for them.
- I wanted the students to get excited about the engineering process, and they were.
- I wanted to have the student work in teams, problem solve, be engaged in science class while learning about forces.
- I was able to see kids use different trains of thought and really buy into the engineering process.
- I was enthusiastic about it, and they are too. Looking forward to extending the program even more.

- I was expecting students to get excited about cybersecurity and they did.
- I was glad to see students interested in these fields.
- I was happy to see how involved the students became in solving the problem that was presented.
- I was hoping that students would begin to understand how important STEM is to the future of our nation. They became aware of the many opportunities that are being offered to them because of the HyperStream program.
- I was hoping that the kit would help me help students learn more about light, which they did.
- I was hoping to get more students interested in the CASE programs.
- I was initially disappointed that we did not have access to all of the engineering CDs, but once I turned the program over to my students, the experience of having to figure it out on our own was beneficial as well.
- I was very excited to see the student excitement with the process.
- I was very overwhelmed when I began to teach the DM and AR and I feel more confident. Students were able to complete projects that were assigned. This was my expectation for my first year.
- I wasn't sure about this when I started it but the student's enthusiasm was amazing!
- I wasn't sure exactly what to expect. The program exceeded any expectations I might have had. It got students really excited about science!
- Improved rigor and student-centered, hands-on instruction.
- Improved student awareness and interest.
- In general I have found that students retain information when given something tangible to attach to their learning.
- In that they did work with Blender, Arduinos and robotics.
- Increased awareness of organisms in our environment and their structural design.
- Increased awareness of the scientific process and got students excited about science and the scientific process.
- Increased interest for 2014-15.
- Increased student engagement and increased test scores.
- Increased student interest and achievement. (2 responses)
- Increased student interest in science.
- Increased student knowledge and awareness.
- Interest and knowledge gained.
- Introduced concepts and careers normally not covered in the elementary setting.
- It gained students interest and knowledge in specific topics.
- It gave me a framework for a biodiversity unit built around STEM that I can build upon next year.
- It gave more ideas to broaden projects used when studying volcanoes.
- It gave the students a great project based learning experience
- It got students interested.
- It got the students excited about science.
- It has made me a better teacher and has made my students better learners.
- It helped kids find their talents.
- It increased student interest and participation along with their interactions with other students.
- It is wonderful to see how STEM and 4-H come together so nicely - participants are able to engage in STEM subjects while learning the life skills taught through 4-H.
- It provided a large selection of materials/tools that we wouldn't have received otherwise.
- It provided a structured lesson that also allowed students the freedom to explore questions on their own. The kids were very engaged during all the AWIM activities.
- It provided opportunities that we wouldn't have had without the Stem program.
- It supported our Foss units and extended our science and math curriculum into engineering.
- It takes a well-rounded team of communicators, writers, designers, builders and programmers to make a successful venture as a team so seeing their role in technology was wonderful for those that thought only engineering people do technology.
- It was a well-organized, enjoyable, learning experience for my students.
- It was great to see the kids get excited!
- It was nice to see the kids striving to solve the problem presented.
- It's always rewarding to have students get excited about science and writing!
- Kids are enjoying the course.
- Kids enjoyed it.
- Kids had fun. Think when they study this area in their classroom, they will have general knowledge of concepts and vocabulary.
- Kids love the hands-on aspect and pay better attention.
- Kids were able to do activities successful and answer questions pertaining to the activities they did.
- Kids were actively engaged.
- Kids were engaged and excited?

- Kids were engaged and were able to determine our main focus as being force and motion, without me explicitly stating it.
- Kids were excited for science.
- Labs and materials were great to use.
- Learners on all levels could complete the activities and get a lot out of it.
- Looking to spark participant interest in STEM, hands on activities they clearly enjoy.
- Lots of hands on interest/excitement. Numerous examples of higher level creative thinking skills.
- Loved hands on.
- Many of the students learned new skills and were able to do things on their own.
- Materials met needs for lessons.
- More involvement and interest.
- More so.
- More student involvement and student directed.
- More students and teachers became involved in STEM topics and opportunities.
- More students interested in career opportunities in agriculture.
- Most of them were able to transfer the knowledge from our program to classroom subjects outside of science.
- My expectations were that the process is often more valuable than the product.
- My goal with the unit was to focus on health literacy standards in the Iowa Core. As the students tested foods for various macronutrients and read nutritional information, they began evaluating the food information they previously had gained from the media and others around them.
- My kids like to do anything hands on and the STEM grants provide this for my students.
- My kids were able to do a great deal more hands on learning and to see how things around them are constantly changing. This is inspiring them to make predictions, experiment, and work to improve the world around them.
- My kids were actively engaged with their learning. Science was so fun for them.
- My main goal was to simply get students more engaged in STEM subjects and this has went above and beyond that expectation through the numerous topics and learning methods.
- My students can explain to their peers how to make the cars go farther and faster.
- My students had a very complete understanding of bugs. They were very eager to share their knowledge with their parents, friends and anyone that would listen to them!
- My students have started to think and work like scientists. They learned to record and interpret data. They are more interested in science.
- My students learned and related agriculture to many different topics.
- My students learned something! They were interested!
- My students loved all of the activities that went along with the STEM unit I chose!
- My students REALLY understand the life cycle of butterflies now.
- My teens were very interested in this topic and enjoyed learning and programming.
- Not exactly sure what I expected. Students learned about electricity. It did get them to ask lots of questions. They were engaged in a lot of the activities. I think it will go better the next time I use this unit.
- Perfectly written for kindergarten.
- Planning this curriculum into 3 weeks of relevant activities, games, and hand-on activities will get the children excited about the STEM field and also see how these topics intermingle and coexist in many aspects.
- Provided opportunities not available during a typical school day/year.
- Providing easily accessed STEM topics. (2 responses)
- Reinforced the core.
- Saw a huge increase in motivation and interest in students that typically haven't shown interest in school!
- Several students really excelled in these classes and will likely pursue more education in one of the STEM fields.
- Significant impact on learning.
- Some growth and continued interested, business partners on board for next year.
- Somewhat. I have worked with FOSS kits and like those better and so do my students.
- Spiraled curriculum that aligns with national science, math and language arts standards.
- Student based.
- Student had greater awareness and interest in STEM topics.
- Student interest and increased vocabulary in science.
- Student interest in STEM courses and careers expanded, increase growth in females in the program.
- Student learning was evident in their discussions and observations.
- Student were either interested or not but had the chance to make that decision as all were exposed.

- Students achieved the standards they were required to meet throughout the course and enjoyed learning as they did so.
- Students actively engaged.
- Students are able to describe an ecosystem and are aware of how the environment affects it.
- Students are able to describe an ecosystem and how the environment affects it.
- Students are better engaged than the lesson plans I had to develop since there were none when I started and more students are taking agriculture courses.
- Students are excited about STEM topics and careers.
- Students are interested in STEM topics, and they are asking more questions than usual. They also want to do "extended" experiments because they think of new ideas.
- Students are more aware of what they are eating and how it affects their bodies.
- Students are more interested and have shown participation in more STEM careers.
- Students are now more familiar with and excited about STEM.
- Students are using more science vocabulary in ag classes, this has increased their content knowledge in science.
- Students are working toward being more independent and are interested in science fields.
- Students became aware of authentic opportunities in STEM.
- Students became involved in their learning.
- Students became more aware of careers that require STEM knowledge.
- Students became more interested in science and math topics. Academic achievement in each of these areas increased.
- Students came to understand the nature of light.
- Students can now tell the difference between reptiles and amphibians.
- Students demonstrated achievement in lesson objectives.
- Students developed a deep understanding.
- Students developed a stronger understanding of the insects, plants, and agriculture.
- Students engaged in new practices.
- Students enjoyed learning about the Scale-Up topics and learned new things while having fun.
- Students enjoyed the curriculum, were excited to come to class, and learned basic program logic while being exposed to related careers in Iowa at the same time.
- Students gained a better understanding of life cycles.
- Students gained experience and knowledge of engineering and motion curriculum through self-designed lessons. Each student studied the same idea but in a unique way.
- Students gained interest in STEM topics, and many continued to learn outside of the classroom.
- Students gained knowledge of new science concepts and vocabulary.
- Students gained knowledge of topics and how engineers approach testing and design that wasn't available to use in this manner before.
- Students gained more knowledge in the STEM areas.
- Students got pumped about engineering.
- Students grew in their awareness and knowledge of weather.
- Students had opportunities to explore their understanding.
- Students had to work through the problems.
- Students have a stronger knowledge of STEM and engineering topics and careers.
- Students have an increased awareness of career opportunities and skills in the STEM areas.
- Students have been engaged in science topics in new, engaging way.
- Students have developed a deeper understanding of scientific thinking.
- Students have performed tasks and had the materials to do hands-on activities.
- Students learned a great deal.
- Students learned how to think critically and problem solve.
- Students learned new skills and were exposed to new opportunities.
- Students learned to problem solve on their own.
- Students love science- I liked the experimentation of the students finding new ways to answer questions. Loved seeing students LEARNING!!!
- Students love science! I liked the exploration of the students allowing them to find new ways to answer questions and build their curiosity.
- Students love the hands on part of this.
- Students make consistent connections and constantly refer to STEM.
- Students really enjoyed engineering and programming.
- Students really enjoyed the hands-on experience.
- Students saw a connection between their world and science, technology, engineering, and mathematics.
- Students saw a connection between their world and science, technology, engineering, and mathematics .
- Students shared their excitement and design processes with me and one another. Parents wrote

or spoke with me about how they shared their interest in the program.

- Students showed a great understanding of force and motion after doing the unit and have retained their knowledge throughout the year.
- Students showed understanding of what they were learning through observation and writing.
- Students succeeded working in groups.
- Students successfully used the Engineering Design Process to create a plant package that preserved and contained their Mother's Day gift.
- Students talked about pursuing careers in agriculture.
- Students used their experiences from the labs to better their test results.
- Students were 100% actively engaged in learning. They were able to be proficient on the goals of each lesson.
- Students were able to actively engage in the content in an inquiry format.
- Students were able to analyze and predict outcomes, as well as improve their ideas and think through problems.
- Students were able to do hands on activities, rather than just read or watch a video about it.
- Students were able to learn the tech areas we covered and to see (mainly through videos) different career opportunities in those fields. And, the students were excited about their new skills and future ways they could use it.
- Students were able to make lots of connections from their learning to their daily lives.
- Students were able to master learning objectives while becoming exposed to a STEM curriculum and different careers.
- Students were able to retain the information better.
- Students were able to show their learning in their science notebooks we kept each day!!! Discussions were insightful.
- Students were actively engaged in their learning.
- Students were actively involved with STEM topics.
- Students were energized, motivated, and demonstrated scientific thinking skills as they worked in teams and discussed challenges and created solutions.
- Students were engaged and active.
- Students were engaged and actively participated in small groups.
- Students were engaged and had the aha moment that this makes sense. Students would also ask questions and come back to me with the answers of their own questions.
- Students were engaged and met most of the objectives/outcomes.
- Students were engaged and therefore I witnessed a lot of learning going on!
- Students were engaged in the activities and started asking questions about science. They have never done that before.
- Students were engaged throughout the entire unit.
- Students were engaged. (7 responses)
- Students were enthusiastic about the program. They were eager to learn about different kinds of technology, and are able to understand technology from a different perspective. Now they know that it isn't always computer- or electronically-related.
- Students were enthusiastic.
- Students were excited about learning.
- Students were excited about the lesson and engaged in the execution of it.
- Students were excited while they took the class. They also were excited to tell me how it related to other classes they were taking...how it related to what they were learning in Industrial Technology, Math, etc.
- Students were excited.
- Students were exposed to a more rigorous curriculum at an earlier age.
- Students were exposed to and challenged in STEM areas.
- Students were exposed to more science and engineering activities.
- Students were given a number of hands-on, relevant lessons and there were many "aha" moments among students.
- Students were having fun learning.
- Students were highly engaged and interested.
- Students were highly motivated.
- Students were more aware of the type of food they were eating.
- Students were more knowledgeable about the mechanical aspects of design and construction and also improved their group work/communication skills.
- Students were positive and enjoyed each lesson.
- Students were provided with hands-on science investigations.
- Students were talking to other students about what they were doing.
- Students were very interested and gained knowledge in science vocabulary.
- Students were very involved and active with all of the hands-on activities.
- Students were working together to find the best possible solutions.
- Students who normally did not show much interest in their education were looking forward to the next lesson in the Carolina curriculum unit that I am

using. I am using the "exploring planetary systems".

- Students who took the AFNR class had their science scores go up.
- Students worked collaboratively on the task at hand.
- Supported our FOSS Units and extended our Science and Math Curriculum into Engineering.
- The activity engaged students and new learning was obvious.
- The activity fit our school goals of productive group work and kept the students' interest for the trimester.
- The administrators made sure they had their user codes for their schools.
- The AWIM project was an extension activity for what I have already been teaching in science. I liked how all of the materials were already included and functional.
- The CASE Curriculum is centered around inquiry and motivating students to question and analyze the world around them. I was able to see this through my student's interactions and work.
- The children were engaged and enthusiastic. They learned many different qualities of rocks and minerals and how to test the minerals. They were able to explain what tools they would use to perform each test on every mineral and how to perform each test. They are able to recall the different qualities of rocks and minerals.
- The children were very excited to continue to use the pieces.
- The children worked with partners to solve problems.
- The class has been successful at Western. We look forward to offering the class again next year.
- The discussion and the improvement concept of the engineering design was fun to watch.
- The EiE Curriculum gives the students a real world problem to solve and it is easy for the students to apply it to other areas of their school lives.
- The excitement of doing the experiments and the knowledge they acquired from the things we did.
- The experience was meaningful and allowed hands on opportunities for the students.
- The first Carolina kit did provide many opportunities for students to interact with living things.
- The hands on activities really increased the students learning.
- The increased engagement allowed for a deeper understanding.
- The intent of the curriculum was to expose students to new concepts not in the school day curriculum using a hands-on approach to learning.
- The kids are excited and talking a lot more about Hyperstream and STEM topics outside of our meetings. And their younger siblings are excited to join someday too!
- The kids asked questions and throughout the unit we were able to answer them together.
- The kids' enthusiasm.
- The kids got to experience engineering that was on their level.
- The kids had a great time engaging with the material while also learning a great deal of information. The program was fully hands on and the kids were 100% immersed in the camp.
- The kids had fun, interacted with others and it was a financially feasible learning experience.
- The kids improved their skills working as a team member.
- The kids thoroughly enjoyed learning.
- The kids were actively engaged! To me, this is a lot of what science is, a lot of exploring, finding details, looking for things someone else misses, and in each of these kits, these were the opportunities the students were provided with!
- The kids were excited about the kits and learned new science terms that then carried over to additional projects.
- The kids were interested and wanted to learn more.
- The kids were thinking and solving problems!
- The kids were very excited about science.
- The kids were very excited every day about what new things they were going to learn.
- The kits are very well put together, and the lab books are easy for my middle school students to interpret.
- The lessons gave the students hands-on opportunities.
- The lessons regarding life cycles and plants met the Core and my own objectives.
- The materials were very hands-on and the teacher's manual was easy to follow.
- The outcomes I observed exceeded my expectations. My preschoolers dealt so well with the higher level content materials. I was very impressed.
- The outcomes met my expectations by giving us a science curriculum that will benefit the students in their future.
- The participants were able to work in groups and solve problems related to what they were creating.
- The participants were very engaged in learning and excited to learn more.
- The patterns unit exceeded my expectations since it challenged all the students to the next level of understanding.

- The program ran smoothly and the kids learned a lot (and had a good time doing it).
- The Scale-Up program enables us to fund activities/projects that might not otherwise be funded. It enables us to expose the students to exciting, interesting activities they wouldn't otherwise encounter.
- The students are now more aware of weather related terms.
- The students are very excited.
- The students became more interested in a STEM topic that they did not know existed prior to this project.
- The students created unique and useful robots.
- The students excelled in becoming better at critical thinking.
- The students had so much fun they hardly realized they were learning.
- The students learned about a new concept (STEM) and investigate and rebuild their projects.
- The students learned new information about STEM and had a great time.
- The students learned the material.
- The students loved the activities and they are learning in areas that we have not focused on before. It is exciting to see that new learning and the excitement that goes with the learning.
- The students remained interested throughout the entire program and left with their projects to discuss further with their families.
- The students seemed to grasp larger concepts due to the extensive amount of labs.
- The students showed much more engagement in the content.
- The students were able to make real world connections.
- The students were completely engaged and excited about STEM topics. They learned how to talk.
- The students were energized, excited, and asking questions. They want to learn more.
- The students were engaged and excited. I think this really motivated them.
- The students were engaged and were able to draw their own conclusions based on their data collection.
- The students were excited about the activities we were doing and became involved in thinking about the topics we were discussing.
- The students were excited and interested in the class. They were active participants, learning new skills and reinforcing previously taught skills. I was afraid my class wouldn't be as appealing as the Automation & Robotics class taught by another instructor, but the students were eager to participate.
- The students were excited and wanted more!
- The students were exited to do hands on activities.
- The students were successful in working together to finding a solution to a problem.
- The students were very engaged in the learning process and had positive experiences with STEM topics.
- The students worked together to meet a goal - the finished product using the engineering method.
- The students’ interest and excitement level was much higher than I have seen with any other group as soon as we started the unit!
- The unit was better than I expected. The teacher guide was the best I have ever used.
- The way students were interacting with each other and when they understood a concept, it was an obvious reaction.
- The youth mostly liked working with Arduinos that were new to most and robotics. They liked the photo editing and coding for webpage design was least interesting. Youth indicated that they were more or as interested in math, science and computers than before. More youth were more interested in possibly working in a STEM field than when they began HyperStream.
- Their expressions of gratitude and celebration towards fellow engineers and sharing of personal ideas.
- There were activities that went into depth about what it was trying to achieve for that lesson.
- There were many different types of activities for students- reading, writing, research, etc.
- They understand the steps of the Engineering Design Process using HANDS ON activities and group work! All things they need for their future.
- They became interested in science!
- They exceeded my expectations. (2 responses) Students don't want club to end.
- They gained better knowledge and experiences by using hands on learning.
- They helped the students understand the content area in a very hands-on way.
- They learned how to design and build different mechanisms experimenting to get the best result.
- They met more than my expectations. The students started out slowly but as we worked more with the projects they became very interested especially when they saw it incorporated into the business world.
- They understood more in depth about weather cycles.
- They understood the importance of wind turbines and how they benefit people.

- They were able to under the world of motion through force.
- They were very engaged and excited to engineer a new plant box.
- This being my second year using STEM Learning I was expecting better formal assessments/achievements and it certainly did.
- This curriculum had hands-on learning like I have always done with science.
- This program helped my students to see the importance of being a "scientist" and note booking. They learned what a table of contents was. They were also engaged in higher and deeper thinking which extended their learning into conversations and individual writing.
- This project challenged my students thinking. It required to think about things in ways that most never have before.
- This was developmentally appropriate and you could gear the curriculum to fine-tune or extend on their thinking.
- Through formative and summative assessments the students were able to show their knowledge.
- Through inquiry, students designs cars to meet RFP standards. Body designs were creative while at the same time meeting standards.
- Through the capstone project students executed the job duties by created a real world website in a team setting.
- Was well organized and gave my students an opportunity to use science, technology, engineering, and math.
- We achieved the home/school connection.
- We did very well answering the questions about animal studies on the Iowa Assessments.
- We had small goals - intro to web page design and robotics. Aall have learned what we set out to learn.
- We increased student awareness of how mathematics, particularly statistic, plays a role in solving everyday problems.
- We learned a good deal of detailed information about how scientists mitigate earthquakes and volcanoes from this program which the students and myself both thought was very interesting.
- We saw an increase in interest in the subject material over time. Participants became more involved and took initiative to explore on their own.
- We taught the curriculum and the students left with the relevant knowledge.
- We wanted a program that was useful, easy to implement, but was outstanding in increasing student's STEM awareness and achievement. We got what we were looking for!
- We wanted students to be able to complete STEM activities (especially in the motion standards) and we are pleased with the results.
- With the curriculum being more student-centered, I saw more higher order reasoning than in the past, which I expected after having gone through the training.
- Yes we put together some great projects this year.
- Yes, but I don't feel as though I had the time to fully implement the program.
- Yes, I think it changed my way of thinking. Children can amaze us with their capabilities when they love what they are learning!
- Yes, my goals were met.
- Yes, students were very engaged in the activities and left the program with a better idea of what STEM is and how STEM can impact their lives. We were also able to teach life skills alongside STEM skills, which is an integral part of the 4-H program.
- Yes, the CASE program is outstanding and is very high quality and rigorous for learning about agriculture and a STEM.
- Yes, the kits fit well into my existing curriculum and provided extra support for learning important STEM concepts. They students enjoyed the hands on learning as well.
- Yes, the outcomes definitely met my expectations. I'm very pleased with the way the students now "think like an engineer" and have developed an interest in STEM topics and careers.
- Yes, the outcomes met my expectations. I am very pleased with how much the students are able to "think like an engineer" after they've been introduced to that way of thinking. They like the problem solving approach and we had some very good class discussions on ways to solve problems. I have had MANY parents tell me how much their child enjoys STEM and that they tell them more about STEM than other parts of their day.
- Yes, the students seemed to be excited to come to class and want to learn more…outside of class.
- Yes, the students were engaged in their learning and work together to meet expectations.
- Yes--but we can always do more. As stated previously, the students are able to explore interests and make new friends but we want to expand the opportunities and encourage more female students to join our group.
- You could see some didn't have a clue but when done, they were getting into it and asking questions.
- Youth discovered science is fun and that there can be several different correct ways to solve a problem..

Did the outcomes meet your expectations? Why or why not?_No

- Did not get to finish the project.
- Did not have enough time to finish the class. However I do not believe this will be a problem next year.
- Difficult to get answers at times and software questions were hard to answer.
- I did not have many expectations for this program.
- I didn't know how to answer this question exactly but I felt the outcomes were met to some degree. I feel it will only improve has I get more used to the curriculum and have time this summer to reevaluate and work on the curriculum to make it more engaging for the students.
- I didn't use it much, was not the STEM fault.
- I don't feel like the program really explained the STEM aspect while teaching it.
- I don't think it was implemented as intended if at all (due to unique situation of transitioning instructors).
- I felt it would be more hands on and inquiry based.
- I had a hard time linking the content we were provided to STEM.
- I lost too many 'programming' students who did not want to do cyber defense.
- I thought the students would be more involved.
- I thought we would get past the difficult part of the learning curve and be able to do some exciting things. Because of our time limits, little direction (much of that is because I don't know what I'm doing, and we didn't have help when we needed it.)
- I was expecting more students to be involved, but there is next year.
- I was hoping that the students would buy in to the CASE curriculum better, but that might be because the curriculum was not able to be utilized like it was designed.
- I was hoping to get more lessons to help intrigue the students, but I spent a lot of time trying to find things on my own.
- I'm not positive I had expectations going in. I knew it would benefit the school going in, and I wanted to see where it went from there.
- Implementation was difficult at an afterschool site.
- In using the curriculum, I felt it assumed the students know more than they do.
- Lack of time to teach the curriculum.
- Many of the materials needed to be revised to fit with our inquiry based SWH curriculum.
- My students don't want to be told the outcome of an experiment, they want to discover and answer their own questions using their own thinking.
- Not all labs worked effectively.
- Not all of my students were able to transfer their knowledge about information without my guidance.
- Some lesson plans didn't make sense and so we had to dig a little deeper to get the information needed.
- Some of this would be my fault and not doing as much preparation ahead of time as I should have. The students were definitely interested in the cars, but not anything else that had to do with the lab.
- The experiments were step by step and left little room for inquiry-based instruction, which it claimed to be.
- They were not as interested or excited about the project as I expected.
- This is truly the first time my students did "labs/experiments", so they didn't do a real great job at recording their observations. This is part of my teaching I need to beef up next year.
- We didn't have time for presentations and sharing learning because of end of the year time constraints.
- We were limited on time and hope to make changes next year to improve that.
- We were unable to implement with students.
- Wish we had more time to expand on what we did.

Other observed outcomes as a result of your Scale-UpProgram

- Enthusiasm.
- Increased students abilities to problem solve utilizing the Engineering Design Process.
- As a result of the presentation that was provided to administrators, more schools started using DefinedSTEM.
- Public awareness of how my school and community support STEM education through the Town Hall meeting in Mt. Pleasant.
- Increased engagement in science.
- Developed a better sense of teamwork and the diversity of strengths within their group.
- Networking now with DMACC. We will continue to network as much as we can.
- More 8th graders talking about pursuing PLTW courses at the high school level.
- Team work, project management.
- We hope to increase awareness and interest in STEM topics and STEM careers. We also plan to pursue new partnerships and build upon existing partnerships.
- Increased parent/child STEM activities at home.
- Increased student usage of STEM vocabulary and questioning, sharing thoughts, teamwork.
- A general increased appreciation of science and tools of science.
- Developing Partnerships - Little Sioux County Conservation Board (Park Rangers and Naturalists).
- Students are more aware of nutrition and food labels.
- The STEM Field trips would have helped us connect the EiE activities to engineering/science careers in a more concrete and less abstract way if we had been allowed to use STEM funds for these field trips.
- Increased awareness of 4-H programming priorities that include STEM.
- Increased enthusiasm for science content.
- Increased the students the ability to explore and create without lots of constraints.
- Excitement for STEM and science by the students!!

Examples of the impact the program had on participants

- 10 youth were able to visit with and see what a real life aerospace engineer did through a Skype interview. 10 youth practiced lessons on drag to design parachutes that would float slowly to a landing.
- A deeper understanding of STEM with a hands-on curriculum and how it is related to agriculture.
- A few of the campers wanted to go back and do some of the stations twice. The Owl pellet CSI activity was a huge hit.
- A week after the program, students were still able to tell me the 5 principles of design process.
- After we completed our 6-week lessons, the children were still eager to create. We left the kit out for two more weeks. I still heard them saying words like "gravity, friction, etc."
- All of our students were fully engaged with the program and built their knowledge as the week progressed. At the end of the week they were able to retain and prove their knowledge about reptiles and amphibians. Kids were excited to come back every day to learn more and eager to tell their parents all about what we did each day.
- All students became engaged in activities. Having students using microscopes, and LabQuest equipment was very exciting.
- An expressed interest in science!!!!
- An increase in student interest in STEM based careers. (2 responses)
- Any student enjoys hands on science or lessons. The STEM programs are beneficial and supply this inquiry for my students. I also work with different programs with ISU in Ames and they supplement programs for my classroom and the other 1st grade.
- Applicable knowledge that is reinforced with hands on activities and challenging students to not only learn information but to process it and create a deeper thinking process.
- As an alternative school setting I am always looking for ways in which to increase student interest in their education. Many of our students have had some type of difficulty in a comprehensive school setting. With these types of hands on activities that I modify to use with smaller groups or individuals, I am able to increase student interest in science and also in their own education.
- Awareness of college programs and jobs.
- Awareness of opportunities.
- Because of the HyperStream/Robotics program in my school, there are students who are considering a minor in technology or computers who may not have had that as an interest before being a member of the club.
- Being able to actually see and do the concepts you read about helps those struggling learners to grasp the information to a better understanding. I also see their questioning skills developing to a whole new level. The questions they are asking are at a deeper understanding after they get to create what is being read about in the book.
- Better technological literacy through computer applications, mechanical systems and coding.
- Children learned that math can be fun.
- Collaboration skills and creativity.
- Comments: Best Day of my life; This is awesome; This is so much fun.
- Confidence in abilities.
- Defined STEM has provided lesson plans for staff members that are aligned both to the Iowa Core and Next Generation Science Standards, which is very beneficial.
- Designing a roller coaster.
- Do not have this information yet.
- Doing the hands-on activities and bringing in a couple guest speakers really enhanced the learning experience. We had kids in different grades, but all of them kept up! They were amazed by what I and the other presenters shared. All of them enjoyed making the different crafts and being creative.
- During an activity, a student commented, "that's what scientists do. I'm a scientist!" Students asked if they could continue doing the activities during their recess, others asked if they could make a copy of the activity to do at home. Students have increased their usage of Tier 2 vocabulary and I hear "I was thinking we could...., I noticed…, we used team work." Some students made their own recipes for trying to make play dough. Many students wrote about their EiE learning in their home/school notebooks and letters to pen pals.

- Earlier in the school year, we studied bees. The students were able to use their prior knowledge about bees to help them with their hand pollinators.
- Excited about the field of engineering.
- Excitement and involvement.
- Excitement for robotics / Excitement for engineering careers.
- Excitement in students / Working together cooperatively.
- For a couple of my students I don't think STEM careers or other STEM opportunities were even on their radar headed into High School. This experience has given them one more possible path to take on their educational journey.
- Gained self-confidence on communication skills as well as using trial and error. Not afraid to make mistakes!
- Girls were very interested in WINGS conference. They were more in gauged in STEM activities.
- Got girls involved more and students had fun.
- Got students more excited about science and engineering. Great hands-on, relevant curriculum.
- Great materials.
- Greater knowledge and science in agriculture.
- Greater problem solving skills.
- Greater understanding of topics and made the students think and work through problems.
- Hands-on learning with materials (5 responses).
- Have improved test scores. Have increase interest in STEM related degrees and jobs.
- Having the necessary materials to teach the topics was beneficial to the students.
- Helped with presentations and timelines.
- HyperStream gave the students opportunities to explore STEM topics they would not have been exposed to otherwise.
- I am seeing enrollment in my classes go up. I am seeing students getting excited about what they are doing in classes.
- I appreciate the design of the AWIM program to highlight collaboration and hands-on experiences for our small groups. The large group interactions and times of information-sharing were also very interesting!
- I believe that the students are better at finding answers on their own. The students worked well with all the interactive lessons.
- I believe the program has increased student awareness of the world around them. They have not had the opportunity to use microscopes and view the world of the microscopic. They have increased their knowledge of the different kingdoms and the importance of structure and function in the design and success of organisms.
- I did not see any profound impact on my students. They enjoyed observing the terrarium and aquarium but it didn’t feel as hands on as I would have liked. We have the Carolina organism kit. I used the weather kit in the dead of winter so it didn't have the impact that I would have liked, if I had used it earlier or later in the year.
- I do like the materials and supplies that come with the curriculum.
- I feel my students had a greater interest in science as a subject as a result.
- I feel that my CASE curriculum has increased the science knowledge for students in my class. They see how it can be fun and relates to agriculture. My students really enjoy all of the hands on activities.
- I feel that the program has challenged students that maybe are not challenged enough in some of their other course work. It was good to see students have to work through their frustrations and to persevere and not give up.
- I had several students interested in an engineering career before the class; after the class they had a better understanding of what it takes to be an engineer. After speaking with a few parents who are and/or were engineers at John Deere I was able to share with my students that the programs they were working with (robot C and Autodesk Inventor) were the actual programs the engineers use. They felt impressed with themselves that they had mastered a program that actual engineers use.
- I had some students who have struggled academically with some of the things we've worked on in school. These kids really excelled and brought a new level of confidence when they were able to be successful with some of the hands on learning that we did with EiE.
- I have a student that was not interested in construction become interested after the project that I chose.
- I have had a number of students who have become interested in future technologies based on this project.

- I have had special education students succeed, and I have had several students who struggled with attendance that had much better attendance as a result of club. I would say the greatest impact is that this club gave a "connection" to school for many students who were not participating in other activities.
- I have had students that have struggled previously but have blossomed in their confidence and academic performance through STEM. I have the great majority of students very excited about STEM this year!!
- I have many boys that are interested in robotics and have come in during their study halls to work on robotics. This has even included students that were not part of the GTT. In addition, I have seen several of the quieter girls complete and understand gear assemblies quicker than the more typical boys. It gave them confidence in their abilities.
- I have observed many great, telling interactions throughout the course of the program that have sharpened STEM knowledge and awareness and critical thinking, problem solving, and teamwork skills. For example, when processing through the Rolling Things Kit, many students are able to articulate concepts of gravity, weight, friction and inertia, though these are not explicitly mentioned. They are grasping the concepts, rather than memorizing often easily-forgotten terms and definitions. While doing so, they are learning to take turns, work together, improve their designs, record data, share observations, etc., etc.
- I have observed several interactions throughout the course of the program that have shown sharpened STEM knowledge and awareness and critical thinking, problem solving and teamwork skills. For example, when processing through the Rolling Things Kit, many students are able to articulate concepts of gravity, weight, friction and inertia, though these are never explicitly talked about in the material. They are understanding and applying the concepts, rather than memorizing easily-forgotten terms and definitions.
- I have often used the phrase "think like an engineer" with my students this year. They have started to do that naturally on their own without being prompted. Just today we were talking about how robots can be used to go deep into water to locate things that are too deep for humans to safely go. One of the 3rd graders said, "Those robots would have to be waterproof". She was right! The students are noticing STEM topics in the news and talking about them on their own or bringing questions and topics to STEM class!
- I have seen a huge increase in students' focus and concentration in the classroom by STEM utilizing hands on inquiry based instruction and I have also noticed their excitement about STEM subjects and agriculture in general. It’s nice to have them be excited to come to class!
- I have seen an increase in the ability of students to take direction and be self-driven. They have become better at asking questions and following directions.
- I have seen kids who normally would be in the background in classes take a lead and help others understand a topic. I have seen kids who not necessarily the "popular" kids find a niche that allows them to showcase their talents, and be the "star" of the class.
- I have seen students’ science scores go up due to the implementing of the CASE curriculum at West Fork.
- I have several students in cyber security that were not sure about a career and this helped them decide. One student started to work harder in school, because he is now has a goal in mind.
- I have students looking at different careers in agriculture, and students who are not interested in going to college now interested in at least 2 years of Community College
- I have students who are more confident about math. I have students being leaders where they weren't before.
- I have students who are not traditional learners. They had many opportunities to demonstrate what they knew through the lab module lessons and found success. I have a student in particular who is from a low income home and doesn't have many experiences to draw from, but was so interested in the module that he set up labs for me and helped other students.
- I liked the engineering part of STEM. My students don't get many opportunities to "engineer" and test what they have created.
- I look forward to observing impact later this spring when the program is implemented.
- I often use the phrase "think like an engineer" with my students. I have seen evidence of them "thinking like an engineer" outside of our STEM time by having them come up to me with a question or something to tell me at the beginning of class that they have thought of since our last class time.
- I saw a student at the store and they told me why they had selected the snack they had in their hand, based on the activity they were going to be doing. Students are looking at foods they once thought were healthy and telling me why it isn't so healthy, based on knowing about carbs, fats, glucose, and proteins.
- I saw the greatest impact on the girls in the class. They were very aggressive in their designs and interested in the career aspects.
- I see and hear more of my female students discussing a possible career in the STEM areas.

- I think all of the kids that participated really enjoyed the activities that we did. I also think that it was surprising to them that what they were doing was really Science & Math!
- I think one of the biggest impacts for the students is their awareness of the STEM careers. We have gone on field trips and have had engineers come in as guest speakers to give the students and understanding of what type of careers are out there and see real world applications being applied. Another impact is having the students use what they have learned in class to help them in solving problems. I don't think they get a lot of opportunity to do this on a daily basis so they are able to see what they are learning is having an impact in their education.
- I think one of the biggest impacts this program has had on students so far has been giving them confidence. They are realizing that they do have the potential to go to a college that offers engineering-type programs.
- I think some of the groups greatest accomplishments came from the Lego MindStorm section. The students learned the basics of programming, while learning how to interact with other members of the group. In business it is always important to listen to other people's ideas and accept feedback. I noticed individual success and group success throughout these meetings. Many of the students that were shy started to talk and participate more. One student in particular comes to mind when thinking about individual success. This student always wanted to do things his way and tended to try and take over a group. Near the end, this student started listening to other student's ideas and allowed other members to participate. Looking back on this year, I think a major accomplishment of the group was development of collaboration and teamwork skills. Most all of our activities were completed in groups and the students seemed to enjoy this. Also, as instructors we tried to provide explanation and background on each of the technologies to provide the students with a clear understanding that creating something special often involves many forms of technology and thought. Experience with each technology will be beneficial for future career/interest development. Overall, the group has really evolved from the first meeting. Most of the shyness and hesitant communication has subsided. There have been struggles of not allowing one or two students to dominate the task that a group is working on. While working with Lego Mindstorms the groups were provided a course to navigate their robot through. Students were able to learn accuracy during this task and that maintaining the same starting position of the robot was imperative when small tracking adjustments can change the course of a robot so quickly.
- I think students have found more of an interest in the hands on aspect of STEM careers and have had students that have decided to change what they are going to go to college for and are now going to pursue STEM related majors in post-secondary education.
- I think the biggest impact the program has had on the students is awareness and confidence. Most of them probably didn't realize that they could program a robot or do 3-D modeling on a computer until they did it! I also think they just became more aware of the field of engineering and of possible college options that they could look in to as they enter high school. I also think that the girls in the program surprised themselves with how good they were!
- Impact: Students are taking initiative to pursue STEM topics on their own.
- In my AFNR class, all students met their goals on the Iowa Assessments this year. I think this was, in part, due to the significant amount of science and math conducted in the agriculture classroom.
- In particular the girls in the program have shown lots of enthusiasm and knowledge regarding the engineering process and concepts.
- Increase in the number of students saying that they are having fun while learning. / Using STEM Learning in the classroom has improved our formal assessment scores.
- Increased engagement and knowledge of STEM topics, increased critical thinking skills.
- Increased enthusiasm for learning about science. Greater learning due to hands-on opportunities.
- Increased excitement about the engineering field and what engineers do.
- Increased interest in science, specifically in lab and hands-on activities.
- Increased interest in Vehicle Design; Awareness of Engineering Profession.
- Increased student interest in science concepts through opportunities with hands on learning. Students learned new concepts and vocabulary.
- Introducing the Engineering is Elementary to my 4th grade students made them more aware of the process of simple machines and sparked a curiosity for the unit they would be studying in science. It also made them interested in how machines in businesses work. When we went to EZ Way they were extremely interested in how the machines worked. They were especially interested in the blueprints for the equipment.
- It encourages them to try to solve the problems after failing the first time.
- It enhanced our unit of study.

- It gave students a taste of the field of microbiology including using microscopes, making scientific drawings, and using the computer (Excel and PowerPoint) to create tables, graphs and presentations. It reinforced the scientific method as students had to design and carry out investigations.
- It has been a big help with several of our students social skills. As counselors, that was one of our original goals that fell outside the STEM area and the teamwork model we use has created some great social skills practice. Our students have really increased their interest in technology and other STEM topics. I can see many of our club members taking more science and math courses at the high school and even pursuing a career in a STEM field someday.
- It has given students an idea about what it takes to do game design. It also gets students interested in news casting and robotics.
- It helped with a better understanding of types of volcanoes and help with their research skills using computers.
- It provided activities for students that other wards we would not of been able to do. The kit provided numerous samples for student to be able to compare their characteristics properties. They were also able to see the process of Electrolysis because of the supplies in the kit.
- It relates the laboratory activities that we do in my classroom to real-world applications. It also provides multiple hands-on activities to show students concepts that they need to learn. It creates questions that they never thought of before, and it teaches them how to cooperate with other students.
- It was difficult for me (since given 1/2 the required time to teach the courses) to see what kind of impact, if any the program or I was making on the students. We were able to get through the foundational material, but not really the "fun" stuff. I felt this could even have a negative impact on the student interest in STEM topics and STEM career opportunities. I think the student surveys may also reflect that negative impact.
- It was the idea that students could take something they are interested in and see how that can relate to a career. I had one student who chose the Chef because she thought it would be easy. She ended up making an amazing webpage for a mock restaurant. She discovered after the project, that she really enjoyed designing and is now looking into graphic design and web page design as career opportunities for her.
- Just the curiosity shown by the students.
- Kids enjoyed the day. They were able to use things they know and apply them into the building of the playing field.
- Kids loved learning about this while using technology and solving real world problems!
- Kids loved the hands on experiments.
- Kids were actively engaged in exploring.
- Kindergartners are hungry for hands on activities and the cars and ramps fit the bill.
- Knowledge of animals.
- Learned to think outside of the box-How can we solve this problem? / 2. More girls building during exploration time in room.
- Led us to reintroduce the subject of light and the EM spectrum to our curriculum after being absent many years.
- Lots of hand-on material.
- Lots of opportunities to work as a team or partnership. Providing opportunities to reflect on their learning.
- Made them enjoy science and want to have it daily and for longer periods.
- Many of my students thought that they were not smart enough for engineering and the females especially thought they could not do this. They now have a much better awareness of what it takes to be an engineer and many are considering careers involving engineering.
- Many of the students involved in our club are not involved in other student activities in our school. These students have explored an interest while at the same time developing their social skills and new friendships.
- Many reluctant learners blossomed as they became successful in doing the STEM activities. I created new partnerships because I was able to offer some great STEM activities--and once they helped and observed, they were hooked and will continue to partner with me.
- Many students are now more aware of STEM careers and have begun to design research projects around those careers.
- Many students became much more interested in STEM topics and opportunities.
- Many students have felt more excited about STEM opportunities and realize they can see themselves in such a role after high school.
- Many students have stated that this was their favorite part of Physics. The hands-on approach has definitely increased the enthusiasm in class.

- Many students in this class have traditionally received below average grades in math and science. Students that have taken this curriculum have slightly improved their grades in mathematics and significantly improved the grades in science. We recently took our Iowa Assessments and I am excited to compare these students' 2014 scores to their scores from last year.
- Many students learned more about gears and motors. Students also began to explore alternative energy sources, such as hydrogen fuel cells.
- Many students thought that they wouldn't be able to build let alone be able to program robots but found success and new interest in engineering. So many students interested in both designing and modeling as well as robotics that they went beyond the classroom and conducted science fair projects by either designing and creating prototypes out of plastic (with 3D printer) as well as created their own robots based on a problem they wanted to solve. Several students even created and printed 3D designs to help alleviate several small problems that two IEP students had within our school!
- More aware of the world around them / noticing patterns in nature.
- More career exploration and knowledge of STEM-related fields.
- More confident in their ability to complete task related to science and math.
- More enjoyment in science class. Increased awareness of STEM opportunities outside of school.
- More excited about Science, seemed to grasp the idea of the Scientific Method better.
- More excitement and creativity. Trial and error (The girls always wanted to change something to make it better.)
- More interested in math and science classes / Interest in pursuing engineering degrees.
- More involvement in building, testing, and making revisions to things they have built. / Interest in careers that are STEM related.
- More materials for student use.
- More students are better ready to meet the demands of STEM related College courses and careers.
- Most of our students were uncomfortable building with everyday objects (index cards, tape, yarn, etc.). After a few experiences with the curriculum and the opportunity to go through the engineering process, the student's self-esteem starting rising, they started verbally sharing their ideas and collaborating. They started thinking aloud to each other about engineering at home using objects around the house. They started connecting their engineering projects to real-life items in their communities and careers in their families. Our students are very proud of their projects and take them home and often tell me when they have constructed their own design and project.
- Most of the students that are in my program and my classroom display the teamwork skills we established in group. They are also able to think of multiple ways to solve problems.
- My 1st graders used more and better vocabulary relating to weather. My 1st graders have a better understanding of weather and the tools needed to track and report weather.
- My class looked forward to science each day. They became more aware of science in the news. We had the Tectonic Plates kit from Carolina and they were very interested in seismic activity and volcano activity around the world. 5th graders who come to my class for reading instruction are very excited about science for next year.
- My first graders have loved all the related investigations with the units. They feel like scientists!
- My kids are more apt to THINK about results and try to change actions/variables to get different results. / I like the fact that my kids do not just rely on me for directions all the time and will use their imagination to test things.
- My kindergarten students were very excited when utilizing the Push, Pull, materials. They looked forward to doing each new activity.
- My school has never had an Ag class. The students have really enjoyed being able to explore some Ag related classroom materials. They have also been able to take this class as a 3rd year science option.
- My student population is made up of 73% free and reduced lunch. Poverty and lack of access to hands on science activities are very real issues for my students. To help them experience hands on, inquiry based science was truly amazing! My students reading and math skills have increased 20% over last year's scores. I believe this is directly related to the used of STEM in my classroom.
- My students are able to use microscopes and do line drawings with confidence. My students were interested and understood the reading materials the unit provided. My students were engaged much more!

- My students are being challenged more than they have been challenged before. They are being forced to think, truly think, on how to solve a problem. I have seen them become frustrated and have had to work through how to work as a group. They have grown as learners.
- My students are eager for class, and they want to have experiments. They know I am not going to explicitly teach a lesson and they are going to discover which they love! It is very student based learning.
- My students are more engaged in science, before some of them thought it was "boring" now they are interested. Some parents have said that their children have come home and taught them a few things!
- My students are much more aware of careers that are in the agricultural field but not directly related to production agriculture. For example agronomy and agricultural engineering.
- My students are so much more aware of living and non-living things. They have taken such good care of our creatures and it has taught them a lot of responsibility.
- My students ask about doing science because they like it!
- My students became very excited about careers that they had never thought of or had even heard of.
- My students had a wonderful time exploring flight and the history of the airplane! We made origami airplanes, talked about the Wright brothers, and then had an airplane flying contest inside and outside. The students experienced team building, tried something new, and made memories they won't forget. Also, when we were building the gliders, my students learned how to be a working design team, what it's like to meet a deadline, what "back to the drawing board" really means, and that hard work and team work reap real rewards. Life-time experiences! My students had nearly 100% attendance throughout these after-school activities, which is real evidence they were ENGAGED and COMMITTED!
- My students increased their vocabulary as well as their understanding of STEM topics. They loved the hands-on learning opportunities that were involved in the program. They increased their ability to both ask and answer higher-level questions. They also became more cooperative learners as they worked together on the projects.
- My students love science and loved the hands on interactions that STEM provided every day. They were so excited to come to school every day and would ask "What are we doing in science today?" They loved watching our aquariums and terrariums every day and we have kept them in our room the remaining of the year.
- My students love the curriculum. They love working with their hands and using everyday materials to do the activities that are in the CASE Curriculum. Without this curriculum I can see that my students would not be push to do different things during agriculture class. They are always thinking and relating agriculture science to their lives through the CASE Curriculum.
- My students loved the materials and working so carefully like an engineer.
- My students were able to apply STEM topics in other areas of their learnings! They even came up with connections that I hadn't even considered!
- My students were engaged and enjoyed learning about the different kinds of clouds. Because of our strange weather patterns this winter and spring the study of weather was very interesting to all students. They had many questions.
- My students were engaged while participating in the STC Module- Forces and Energy, even the non-traditional students! They gained a lot of confidence and skills in data interpretation and graphing.
- My students were excited to learn about science topics that were based on real life experiences. Building and testing ramps to see which would run faster led students to see that all of the curricular areas are needed together to solve problems every day. They used math calculations to time the balls, they used writing to record what they found. They learned how to record data on charts and how to analyze data.
- My students were more involved in their learning process by having minds-on activities. They were thinking critically and making connections between what they were doing in class and the concepts they were developing as they completed these tasks. They came to my classroom excited to see what we were doing that day.
- My students were sooo excited. Everyone in our building knew what we were learning about. Students were focused, independent, inquisitive and productive EVERYDAY! I got to be the facilitator and they took charge of their learning!
- My students were very excited about the project; they enjoyed testing and trying different hypothesis. Due to their age, they are naturally curious and wanted the freedom to test and try more than what was required in the sessions.
- My students were very excited to implement STEM based projects. They really enjoyed the activities and have an idea of STEM based careers. They learned to work together and problem solve as a team.
- My students were very interested in the topics presented with Defined STEM. They were very interested in the forensic science activities!

- My students would like to work with animals/nature when they grow up. Many of them would like to be a county conservationist.
- One example that I observed was an autistic student and the interest he showed for the program.
- One group of students tried numerous times to accomplish all the requirements of the projects. They only had to accomplish 1 of 3 requirements, they accomplished 2. They were very dedicated to the program.
- One male student several times said that he would be interested in being a volcanologist. One female student said she had no idea about why rocks are important in the search for resources and expressed interest in geology.
- One mother said to me "Dalton is really going to miss coming to your program after school" Also, I think they understand more of what technologies are and that they might even be able to come up with something to solve a problem.
- One of my first grade students wishes to be an engineer someday! Other students are seem to be developing problem solving skills and asking questions about how objects are designed and operate.
- One of my SPED students really took interest in the guppies. She could explain everything that was going on with them. During the STEM lessons, her writing improved because she was so interested in what she was writing about. The students loved the science journals. They like being scientists, exploring, asking questions, and learning!
- One of my students who did do not work well in groups did a great job because of the structure of the program.
- One of the obstacles we face in Girl Scouts is parent volunteers who want to lead the girls to the right answer or do the work for them. During the Real Einstein event at the University of Dubuque, we had a parent volunteer observing the Skimmer activity that was being facilitated by an education student. The parent complained to one of our staff that the girls were not getting enough direction on how to put it together so it would work.   As the girls worked on the project and worked on redesign, to get a better result, the parent saw how the girls were learning from their mistakes. The parent later apologized to our staff person saying how amazed she was at how creative the girls were in their problem solving. She said she had an ah ha moment of letting them learn by doing.   During our Innovate and Create event, girls were working on the Jet Toy. As girls went through the process, they had an opportunity to test the Jet Toy for speed and distance on a large track out in the open. Many people stopped to watch the girls test their Jet Toys. One group of girls was making some adaptation to their design when asked by an adult passing by what they were doing. The girls were wearing their team badges, and each girl went on to describe her role. Later in the day one of the girls went to the John Deere booth where they were making employment badges for the girls that said “Future Engineer” and asked if hers could say “Test Engineer” instead. She went on to explain that she was the Test Engineer for her Jet Toy group and that is what she is going to be when she grows up.
- One parent told me their child said they wanted to be a mechanical engineer when they grew up, but they also wanted to be a banker too. They all know now that an engineer is simply someone who solves problems for a living in many different areas.
- One student was interested in how design impacts flight, 4-5 students were interested in exploring science or math careers during a career study.
- Opening new understanding of engineering and its ever-present place in the world. The use of math and science in just about every career and work environment.
- Our ELL students really get science because they are pulled for their additional language lesson. For our AWIM unit, they were allowed to stay with their peers and complete the unit. They loved it. The students couldn't get enough of the hands on science that they miss every other day. Their attitude toward school is much better and they are excited to hear "science time".
- Our first graders were very interested in the program...very excited to be engineers.
- Our PLTW programs have sparked a positive interest in the STEM field for some students who, otherwise, may not have gotten STEM exposure. The 3D design and Robotics units were very interesting to many of the students.
- Our robotics participants are very excited to continue their learning throughout the summer and hope to create a First Lego League next year if they can find a willing adult to help.
- Our students were much more involved with hands on learning activities. They are beginning to understand the idea of fair testing practices and reflecting on what they have learned. The students are also gaining skills in using scientific tools and the importance of collecting good data for that.

- Parents enjoy seeing their kids learning during the out of school time. Many parents at one afterschool site are employed by Rockwell and made comments to child care staff how pleased they were to see science at their program.
- Parents have stopped me to tell me that their student loves the classes that I am teaching. We are from a very small community where everyone knows everyone and I am hearing a lot of great comments about student's interest in the STEM careers.
- Participants were able to describe in detail about many factors about birds. What the eat, how they eat, how they fly, how their feathers work, what keeps them warm, and about their eggs.
- Participants were motivated when they came to class. Participants worked more effectively in groups.
- Participating in the Food Chemistry Carolina STEM unit caused students to evaluate their food decisions more closely. While prompting students to comment on the sugar and fat in their diets, the unit also expanded students' understanding of "healthy" food as they learned that people need all of the major macronutrients for proper nutrition.
- Particularly the younger students weren't previously aware of what science and engineering tasks looked and felt like and many of them found them to be enjoyable!
- Previously students thought agriculture was production agriculture. This grant helped students see the science behind agriculture and that science and natural sciences can be fun and engaging. Students have gained a better understanding for careers and more nontraditional students who have no farming background are joining the class because they realize that agriculture can be fun.
- Prior to starting the unit, I asked students to generate questions about space they'd like to know about. Students didn't even know how to formulate a question because they didn't know vocabulary or had never really considered space and what is out there. After the unit I asked them to generate questions again and they had a lot that went beyond our topic of the solar system. I believe the unit at least got them thinking and discovering their own curiosities.
- Raif started his Gravity Cruiser with little confidence under the shadow of his big brother. He ended up getting his own Gravity Cruiser to travel 3m and was very excited. The excitement and individual sense of accomplishment generated by the lesson was the best I've seen from Raif all year.
- Real-life activities and animals.
- Recently my students were creating a video for me to use in a presentation I am putting together for graduate school. Students were to create a video showing how project based learning has impacted their classroom, this was completely optional. Two of the skits created and performed included the use of STEM in connection with project-based learning. In the one video the student who was portraying the video had the class say what each letter in STEM stood for. The other video also used STEM as a direct connection and showed examples. Also my students now connect many of our day-to-day lessos to STEM and can identify how things we are learning are connected to science, technology, engineering, and math. I have found sometimes they get a bit worried if they cannot figure out right away how something connects to each area. As a teacher, this has been wonderful to watch and I KNOW this class will continue to make connections to STEM after they leave my class.
- Revealed career opportunities to students.
- Saw that there are ways to bridge curriculums.
- Science scores have gone up and there is a renewed interest in Agriculture Ed classes.
- Several students have expressed an interest in design and engineering as careers. Students have a better understanding of forces; torque, gear ratios.
- Several students have shared that they have a better understanding of engineering and technology. During my regular class day, students from my Afterschool Stem group refer to things we learned and extend the other students thinking.
- Several students left very excited about animal science. A second grade girl decided that she wants to be a scientist when she grows up. She loves animals and had no idea that there were people that studied animals to find out how they survive. Several other students left asking when we would be doing this program again. All students left with their interest peaked in science!
- Some new friendships were made during the group time.
- Some of our students had not done any coding/computer programing before HyperStream. They were really got into it and all 9 were able to do the Alice3 exercises and create simple games, some going further than others. But, I was really surprised by how their interest level grew the deeper we got into programming. They had fun with it and learned it. We had almost perfect attendance and parents told us their kids were disappointed if they rarely couldn't attend our meetings.

- Some of the students did independent research on some of the topics discussed. Some of the students did the activities at home and we discussed if the outcomes were the same or different than when we did them at school.
- Some of the students learned a new skill that they can use for other classes.
- Some students gained confidence in using the technology provided, but it was frustrating because we had little help and just had to muddle through on our own. Some students like that kind of challenge, others find it scary - they don't know how to "fail" and be okay.
- Start date June 9- Be able to apply topics to a wide range of other situations. ex. how the dispersal of seeds is relevant to other things in our daily life/ how they operate. Also applying topics like force and motion from science worksheets/experiments to hands-on activities and crafts.
- STEM helps all students to get involved in hands on activities. Even my special education students can excel in STEM courses where they absolutely shine.
- Students are better at performing the scientific process.
- Student engagement increased. Deeper thinking occurred.
- Students were more engaged.
- Students were very excited to use the cars. They really enjoyed the hands-on aspect.
- Students achieved greater awareness by utilizing hands-on labs to better understand the concept(s) being taught.
- Students are able to relate everyday topics back to science and realize that what is being taught in science is applicable to everyday life.
- Students are able to think outside of the box with the hands on work conducted through the STC-Kits.
- Students are already planning for next year. They are talking about doing multimedia projects for others this summer and planning for college.
- Students are becoming more and more confident doing STEM activities (i.e., asking questions, planning a design, testing their design, etc., basically, the engineering cycle. Students are learning to engage with STEM concepts at younger ages, making it easier to challenge students in the upper grades. It has enabled our district to better "hone" and align our standards.
- Students are excited about class and students are making connections between science and math.
- Students are exploring other areas in medicine besides the traditional doctor and nurse. These events stimulated 22 students to sign up for job shadows to explore other areas within the health science industry. These events provided opportunities for students to make connections with professionals. Learning what school is like, what is the job like, what do they like most, etc. Students I felt were able to connect with the hands-on activities and feel more comfortable with the advanced language prior to these events.
- Students are incredibly excited for science class!
- Students are interested in coding; students are aware of programs in regards to engineering that they were not aware of prior.
- Students are more able to explain topics (like a vortex) after creating one themselves. Students have a better understanding of topics following the labs we completed.
- Students are more aware of how speed and acceleration work together.....and how to problem solve.
- Students are more aware of the "amount of design and engineering that has gone into the built world."
- Students are more aware of the importance of measuring accurately. They've become better at using measurement tools. Both of these skills are taught in math, but using them in Design & Modeling has helped to reinforce the skills while making real-world connections.
- Students are more aware of what is required of electricians. I had a lot of students who said they are interested in being an electrician. Students loved this program!
- Students are more engaged and involved in STEM learning. Students have a deeper understanding of the topics I teach.
- Students are more engaged when doing STEM activities.
- Students are more excited when learning about insects, plants, and agriculture.
- Students are more familiar with investigation and inquiry method.
- Students are more interested in Computers and Technology now.
- Students are more interested in robotics and creating/developing robots that might be useful in a real world situation. Students are more interested in Cyber Defense and App creation as well.

- Students are much more aware of programming either for robots or computer operation. Multimedia now represents a bigger list of skills and programs. The group of cyber students now understands it is more complex than being a basic network user.
- Students are much more interested in science thanks to the STEM curriculum provided. They always look forward to the labs!
- Students are much more interested in STEM/Engineering careers. Students who previously disliked STEM are enjoying working with their hands to create various objects/plans.
- Students are not always aware of the jobs in STEM fields as these are not as visible or familiar.
- Students are now aware of STEM and what various STEM topics are. Students have a better understanding of the impact STEM will have on future careers.
- Students are now following and interested in hybrid vehicles. Students created a design for a wheel chair and ramp to allow ease of access for a student after completing AWIM unit.
- Students are now more familiar with what STEM is. Students have shown more interest in STEM type activities.
- Students are really enjoying the hands on part of this science investigation.
- Students are very excited about Science.
- Students are willing to work on EiE at home without being homework and were able to actively engage in critical thinking based on what we have been covering.
- Students became aware of how companies like Pioneer and Monsanto utilize the concepts of scientific inquiry to develop new products that many of their families use in the production agriculture enterprises.
- Students became more aware of the weather on a daily basis and how it affects their lives. They were interested in the extreme weather topics and enjoyed all of the hands on experiments and activities.
- Students become aware of STEM related occupations.
- Students began to understand how to test and idea and that we can vary one variable but need to test at least 3 times to check the accuracy of the results.
- Students believe that they could do the same thing as some of the engineers who visited; Students solved problems as a team.
- Students can now tell the difference between reptiles and amphibians.
- Students commented on the curriculum and how it allowed them to create their own learning and able to work together to solve problems and discover new information.
- Students could now identify that they were interested in engineering. Before they might have had a vague understanding of what that might be but the STEM project gave them a much more concrete look at the design/re-design process. Students expressed interest in doing this kind of activity.
- Students created the Iowa Student Learning Institute (IowaSLI.org), a non-profit encouraging student voice in education through the power of technology; The students hosted the first conference in October; Created the First Annual Waukee Film Fest (WaukeeFilmFest.org) to be hosted this May showcasing the creative talents of the Waukee Community School District (grades K-12 and staff) through storytelling and media production.
- Students definitely showed an excitement for working with programming and animation. They were very engaged and tackled the challenges that went with learning how to use programming language. There have been a couple of students who have asked about learning some more this summer on how to code and program. Their awareness for STEM has increased. Due to a lack of STEM opportunities in our building, this program opened up doors for students that probably would have been left closed without the participation in these types of activities.
- Students definitely wanted to know more about electricity. They also became more comfortable with answering questions based on their own learning as opposed to the more traditional, what the teacher expects.
- Students developed a huge set of technical knowledge and skills in Plant Science. I had many students who came in with little or no knowledge of the science of plants and have gained a huge set of knowledge. I also had a student who now wants to have a career in agronomy - which before the class he didn't know what agronomy was.
- Students did not have a clear understanding of what an engineer was or what they do. This clarified their understanding.
- Students didn't understand that what they wanted to be when they grew up (such as a vet or engineer) focused on STEM. They also didn't realize that they were using STEM in everything we did and talked about.
- Students enjoyed access to STEM topics. (2 responses)

- Students enjoyed doing another extension activity in preparing for their culmination activity of building balloon-powered/incline plane cars for the Car Olympics.
- Students enjoyed observing/touching the living organisms used for this unit. Note taking was enjoyable when done together as a class--especially diagramming habitats
- Students enjoyed the experiments.
- Students enjoyed the hands on activities. They loved watching the butterflies develop and track their growth with the chart!
- Students enjoyed the lab testing that we did in the food chemistry unit.
- Students enjoyed the material and liked doing things.
- Students enjoyed working with the glider kit. It made a very hands-on impact on learning how variables can affect flight. When students worked with the motorized car kits, they were provided with challenging problem solving tasks. They found that these tasks could be very frustrating and had to learn how to keep trying different designs until they met their goal.
- Students excelled in hands-on labs. They asked more in depth questions before, during and after working in lab groups.
- Students experience with genetics and DNA from CASE curriculum aided in students achievement in biology. I had many AFNR students say they understood science question on the Iowa Assessment due to their exposure to DNA and genetics from ag class.
- Students experienced real life examples of STEM in problem solving tasks. Students were able to make connections to STEM careers through the use of Defined Stem.
- Students found the material very interesting. They loved the hands-on learning. They always look forward to science time.
- Students gain more awareness by using hands on curriculum.
- Students gained a greater awareness and interest of careers in the wind business, including how to earn experience/a degree in the field.
- Students gained an outstanding awareness of Agriculture careers and an appreciation for the many scientific aspects of agriculture.
- Students gained confidence in science topics. / Students gained appreciation for life cycles.
- Students gained confidence in their ability to write computer programming when their test beds and other projects worked as designed. They remarked, "This is cool!" Students like to explain how to write program code to their peers. One student appears to be considering a career in engineering.
- Students gained excitement for STEM-related topics and acquired the realization that science is not just something you read about in a book.
- Students had opportunities for many hands-on learning activities.
- Students had to work creatively and hands-on, which is not always the way they work at school. I found many students getting frustrated that there weren't specific instructions for some of the activities and that they had to think outside of the box. I think this was very good for their academic growth and their ability to think about different ways to accomplish tasks.
- Students have a better understanding of the knowledge and topics since they are using hands on activities.
- Students have a greater understanding of STEM and the connection and collaboration necessary in those occupations. Students were able to demonstrate their understanding of STEM concepts/projects to other grade levels and the community.
- Students have already begun to create their own websites (in their Google accounts) as alternative ways of making presentations to their classes for assignments. Students also more realistically believe they could learn to program computers.
- Students have become more aware of ecosystems and the effects of pollution on living and nonliving things in an ecosystem. (2 responses)
- Students have become more aware of the importance of keeping our waterways clean. There have been several oil spills or chemicals during the time we met. It was great to be able to relate the clean-up efforts taken by those involved in the spills, and compare them to what students learned about their own "clean-up" efforts.
- Students have become more confident in their abilities to do STEM.
- Students have developed their skills in Science, Technology, Engineering, and Math careers.
- Students have discovered the importance of collaboration and working in groups. / Students have found success in the program when they are unable to find success in the classroom.

- Students have expressed interest in becoming engineers. Students have expressed interest in college programs.
- Students have gained an awareness and interest in the Fuel Cell Cars, but I'm not sure they are aware of the possible job opportunities and requirements of an engineer.
- Students have hands on Science based agriculture examples to work with. Students participated in a wide range of student centered learning opportunities.
- Students have mentioned how being involved in this STEM class has helped them be leads in other classes because they have been exposed to certain topics. It also has increased their professionalism and competitiveness when it comes to content knowledge.
- Students have more confidence in areas with the computer that they didn't before. Students were able to apply what they were doing in the HyperStream STEM program to their photo design program.
- Students have more interest in developing their own ways of engineering solutions to a problem.
- Students have shown a great deal of excitement in learning from our STEM programs (JetToy - AWIM and Electricity - Carolina Biological). Most of our students spend free time looking for ways to expand their knowledge in these two areas.
- Students have used data logging equipment and understand the process involved with scientific inquiry.
- Students identified bridge types in our city based on the information that they gained from our STEM kit. Students showed increased enthusiasm for science instruction.
- Students improved their ability to problem solve and utilized team work on a regular basis.
- Students learned a great deal about the light as a particle and light as a wave debate.
- Students learned about the Agriculture Industry and all of the opportunities in it.
- Students learned not only technology, but how to work with a team, meet deadlines, do research and manage a project.
- Students learned that they could succeed if they persisted on the task.
- Students learned to cooperate and work with others.
- Students learning increased throughout the course of the STEM program; they were excited to learn and enjoyed the hands-on activities provided throughout the program. Students looked forward to my class each day and talked about the activities we completed throughout the course with other teachers, administrators, parents and friends. Administrators, who observed my class, were always positive and enjoyed seeing the hands-on activities students were completing during my class. The students realized that science and math play an important role in the Agriculture Industry, and were able to apply it throughout many activities throughout the course.
- Students look for real-life examples of STEM careers.
- Students look forward to the class and have an enthusiasm for the activities. They have said they have given more consideration to STEM careers.
- Students looked forward to science class every day because they felt like real electricians. They loved being able to create a flashlight with only a few materials. Most students were completely unaware what was really in a flashlight.
- Students love all the hands-on activities provided with the STC kits. They also like to think-pair-share so that they aren't working on difficult concepts alone. They also get to use equipment that they might not have had access to without this grant.
- Students love science and were actively engaged with the hands on activities throughout the course of the program.
- Students LOVE science. The hands-on learning was very engaging for the students!
- Students loved the hands on investigations. The Circuit Kit allowed students to problem solve and work out problems. Students also learned how to work collaboratively in groups with minor problems.
- Students loved the hands on science experiments that they didn't get to do in science.
- Students loved the unit. They looked forward to science lessons each day.
- Students made the comment they did not know that engineering was fun. Students said they liked that science meant they could be creative.
- Students now understand the concept of STEM; Students who are hands-on and out of the box thinkers really excelled when building their AWIM products.
- Students really enjoyed the hands-on science investigations and it they did a great job building on their on curiosity and higher level thinking.
- Students really enjoyed the hands-on, create-your-own project.

- Students really like the lab portions of the CASE and STEM programs. I have a few more students interested in going to college to learn more about the topics discussed in these classes.
- Students really took learning with technology to the next level. One student got highly involved with coding, others enjoyed the multimedia aspect, and the others enjoyed building and using the NXT robots.
- Students saw how engineering applied to MANY things, especially beyond science class.
- Students see that science and math can be exploration and responding to your findings. With our guest speaker they had good exposure to real STEM.
- Students seemed to enjoy the program and were interested in learning more about straw rockets and how they worked. Students learned more about working in groups and how to solve problems as they occurred.
- Students seemed very excited about the topics as they were fully engaged.
- Students sharing thoughts and ideas openly and having evidence from the investigations to support their ideas.
- Students that were not previously involved in activities have found a place.
- Students think STEM is fun! Student engagement is 100%.
- Students used inquiry to research how to develop toys that focused on the concept of force and motion. I truly appreciated the experimentation with groups too.
- Students used technical terms with true understanding in their final presentation and commented often about how proud they were to be able to figure things out on their own. Students developed skills in the mechanics of building and the techniques for working with others in small groups toward common goals. We also explored how important it is to keep track of your data throughout these experiences.
- Student's vocabulary and knowledge of the scientific process increased. Students began engaging in more hands on science activities of their own initiative and interest after using the program.
- Students went home and were continuing the straw rockets at home. The Engineering with Nature is going to impact our knowledge of seeds. We are building an Eagle's Outdoor Classroom and Garden this spring.
- Students were able to become engaged in learning and exploring with different types of weighing and measuring.
- Students were able to consider different STEM employment opportunities.   Students demonstrated greater understanding of gears.
- Students were able to experience and see things that we cannot provide for them in a normal setting. One example is actual human organs that were brought by the Medical College. The other major impact was the hospital tour. Students were exposed to the variety of careers available. They were also given insight into opportunities and resources to assist them in their career endeavors.
- Students were able to experience hands on technology used for STEM areas, as well as the type of divergent thinking needed to be successful in carrying out the task.
- Students were able to experience the Engineering Design Process. They realized it is not a step by step process; you can go back and forth and are supposed to! They realized that their first plan probably won't work and were able to reflect on why it didn't work.
- Students were able to gain a much deeper understanding of the Scientific Process.
- Students were able to have hands-on science materials readily available. Students enjoyed the times that they were discussing with small groups and investigating the materials.
- Students were able to learn measuring skills and bring these skills to the next session. Students learned the difference between amphibians and reptiles and learned the traits between the two while doing Stem based activities
- Students were able to see the application of math in science and science in math. Students were able to apply their math knowledge and skills to show that you do need math to run a business.
- Students were allowed to make discoveries on their own...they were allowed to fail and retry. It was a wonderful inquiry based environment full of students asking each other questions and solving their own problems. In addition, we collaborated with Palyworks and are building a new PreK playground (student designed).
- Students were completely engaged. They couldn't wait to get to science class to work/play with the kits. Students also worked as a team. They were able to talk through their observations/data and problem solve from those.
- Students were engaged and motivated!
- Students were engaged in exploring materials and determining new findings through experimentation.

- Students were engaged in hands on science. They made scientific observations and asked great questions. They were extremely engaged and used complex vocabulary that they normally wouldn't use.
- Students were engaged in the activities and started asking questions about science. They have never done that before.
- Students were engaged with science content.
- Students were excited for science. It was nice to teach hands-on science, rather than lecture.
- Students were exposed to new concepts and given opportunities (field trips) that they would not normally receive had they not participated in this program.
- Students were exposed to new STEM careers; Students were exposed to new ways to think
- Students were exposed to new topics and lessons that they have never been introduced to such as making windmills, submersibles and parachute designing. They were excited to learn and loved the ability to be able to "fail" and then learn from their design mistakes to eventually have success. Students had a positive attitude toward STEM topics after each lesson.
- Students were generally interested in the hands-on kits. They really enjoyed working with them.
- Students were interested in learning about the topics - especially the owl pellets.
- Students were made aware of different career options and educational paths they could take.
- Students were more engaged in class, they enjoyed the lessons.
- Students were more engaged in classroom setting and interested in understanding careers and career opportunities based on the fact that they were able to use more technology and grow plants and identify experiments that helped them understand the information that did not only come from a power point or lecture!
- Students were more engaged in the learning process even when they might not have like the particular subject that was being taught at the time. This happened because the curriculum is hands-on and inquiry-based. Much of the course is done in a teamwork setting and each student felt they had to do their part because if they didn't their partner would not be left doing more than their fair share if the activity, project, and problem.
- Students were more focused on the science topics.
- Students were very engaged and excited about the STEM unit on Changes. They learned how to work well with a partner.
- Students were very engaged throughout the whole unit and really enjoyed the hands-on aspect of it all.
- Students were very excited about the hands-on activities/experiments that they participated in. They also were excited about recording in their science journals.
- Students who never thought about going to college are interested in going to college for STEM careers. Students have a greater knowledge of the STEM programs available in college and want to be involved with them.
- Students, although just in second and third grades, have indicated a greater interest in possibly pursuing civil engineering as a potential job possibility someday.
- The "My Senses" unit correlated nicely with the math topics of stack and slide; math vocabulary cylinder, cube, and sphere (sorting by size); and our reading series that mentioned the senses.
- The ability to investigate, plan, try, and revise without frustration.
- The activities really forced my students to dig deep and engaged their thinking.
- The administrators are learning about rigor, cognitive complexity. The site provided them with examples to further their understanding of rigor as well as having a great resource to share with their teachers.
- The ambassadors said one girl was really engaged. We were impressed with her work. Her family didn't have a computer at home. She just keeps on working. When you talk with her about an idea she is willing to do it (comparing her to some of the other girls that weren't as engaged). One of the male members was particularly engage with one of the mentors. He wanted to go beyond the Arduino manual to try new things on his own and asked the ambassador for help and suggestions.
- The AWIM curriculum is a great inquiry-based program. Hands on physic activities for elementary are limited in my school. My students learned that science is fun and engaging. Many of my Talented and Gifted students struggle with cooperation skills. This curriculum encourages small group work and the development of leadership skills.
- The biggest impact is the connection to literacy. The students gained many non-fiction reading strategies and growth while also learning the content required to complete the activities.
- The children enjoyed the hands-on experiences. The children were researching related topics on their own.

- The conversations they have now include types of thinking skills used in designing the project. They are better at team work and collaboration.
- The curriculum and equipment has let students do projects and labs they would have never gotten to experience otherwise.
- The EiE kits are very well done. The students used the hand-pollinators they designed to pollinate our Wisconsin Fast Plants in the classroom, and plants in our school garden. The students learned how to connect the EiE Designing a Water Filter to the novel A Long Walk to Water ,and a service project in Africa. The students became aware of the need for clean drinking water all around the world and how hard it can be to obtain it in some parts of the world.
- The energy from brainstorming in the students' teams was an impact in my classroom.
- The enjoyment of learning new things about the amphibians and reptiles that live in the United States. Increased knowledge about what STEM stands for.
- The experiments were good and students had a better understanding of the concepts. Especially soils
- The group asked for more, so am planning another session for spring so that leads me to believe they liked it and got something out of it. When our time is up, the students linger and continue with their activities, they are also excited about showing their parents what they have experienced.
- The hands on experiences have been wonderful for students as for they were have never gotten to experience some things without this program.
- The hands-on activities definitely kept students engaged!
- The kids all love the experiments! They remember doing them-they always ask good questions! Gives opportunities to guide their curiosity!
- The kids are more excited about engineering and the hands on role it plays in our classroom.
- The kids became deeper thinkers and learned how to question what they were working on and what they could do! Loved the Hands on activities.
- The kids became deeper thinkers and questioned more. The kids loved experiencing the hands on- & were more experimental!!
- The kids got very excited to work on the stream tables. They also learned to work in groups as well.
- The kids really enjoyed it and have asked to do more.
- The kids were very excited to come to class and they loved the hands on learning. The kids really enjoy the goggles for the Straw Rocket kit. They told me that they felt like scientist.
- The kids were very excited to see what animal (reptile/amphibian) was going to be at the meeting for the day and they really enjoyed the blank park zoo visit.
- The kindergarten class really enjoyed learning about weather.
- The kindergarten students were able to extend their knowledge of patterns beyond the basics of an AB, AAB, ABC, etc. of patterns. They were able to see patterns in nature, architecture and other places in their daily lives. It made them look beyond their comfort zones.
- The knowledge they gained carried over to other areas in their lives, it did not just pertain to the camp. the speech teacher told me that one of her students pretended to be an insect getting nectar from a flower. When asked how he learned that, he told her at bug camp! I also loved the fact that we implemented videos to accompany the lessons. One told the 3 parts of the insect body. Our kiddos went around singing the song for days!
- The main benefit I believe HyperStream offers my students is the exposer to real people in IT Careers in Iowa; showing students what they can pursue locally.
- The materials that the kits came with were thorough. This allowed students to design their own experiments in order to understand physical and chemical reactions. The literature that came with the kits was outstanding!
- The middle school students I work with prefer to work on projects that are hands on. This project challenged the students because they had to figure out what worked and what didn't.
- The on example that really caught my eye was that the students were not afraid to try different examples to see what worked the best. They knew that they had the availability to more materials so they tried my different ways to see what worked best.
- The participants asked informative questions and enjoyed the hands-on experience. The participants asked to do the same activities again once the theme has changed.
- The participants enjoyed using the materials in the kit. They were able to understand the vocabulary terms (ex. force) by exploring with the materials and participating in the extended activities.

- The participants had ideas of things they wanted to try that we did not have time to do when we met as a group, so we are considering offering another experience as a follow up.
- The participants really enjoyed and learned from the hands-on nature of the units. Both units, Electric Circuits and Ecosystems introduced the topics as "real-world" science with numerous examples of careers.
- The participants were able to learn about a topic that had not been previously offered in an out-of-school 4-H Clover Kids program in our county before. They were able to gain hands-on experience in learning about birds and showed great interest in continuing to learn more about them. The participants were also able to link information they had previously learned with information that was being taught in the STEM program.
- The participants were very engaged in the activities and wanted to continue them beyond the hours of the program. They were excited to learn we would be offering more opportunities like this one.
- The positive impact on student and interest has been amazing. I had the opportunity to hear students' conversations while working on the Defined STEM activity, and their excitement.
- The program allowed students to be exposed to different careers that could be related to the STEM field.
- The program has impacted the students by getting them much more interested in Science. They loved all the hands-on activities.
- The program has increased interest in science for many of my students. They enjoy the hands-on learning. They have also improved their ability to write and describe their observations and ideas.
- The program helped them explore their community and have an impact on it. Students came back to the program with research they did outside of the program.
- The program made the kindergarten students in my class excited about the possibility of working in one of the STEM fields.
- The resources and curriculum materials have improved student engagement and content retention.
- The STEM program allowed the students to be more engaged in their work, and the materials that were given were more hands on. The students learned the importance of how to maintain not only a suitable living environment for certain animals, but they also have a greater understanding of different animals have different needs
- The students absolutely loved the projects, working together as a team, collaborating, testing, building and making design decisions.
- The students are confident using microscopes and other magnifiers. They are capable of preparing slides and comparing specimens in a scientific way.
- The students are learning the Engineering Design Process and finding out the thinking which involves asking/imagining/creating/planning/improving are important skills that don't involve finding just one right answer. It is about the goal or challenge and continually striving to problem solve a better solution. Secondly, they are learning how to work together as a team to come up with a solution to a challenge.
- The students are making connections between real life and what we have been working on in school and in STEM projects. When we were trying to construct a paper tower to hold a Beanie Baby one of my students said, "I am going to use what I learned at the water tower, if those legs can hold that big thing, I think this plan should work too." I loved seeing the group take something they had learned and apply it to something else.
- The students are very excited about science topics. I believe that even at the first grade level, the students became more aware of careers in the STEM areas due to the materials in the program.
- The students are willing to go back and try again when it doesn't work the first time. They are developing some stamina and perseverance and that has been lacking in our students. / They are thinking like engineers and looking at things differently than they have in the past.
- The students began to understand wind turbines a lot better and the importance they have in northwest Iowa. They see them going up all the time, but they did not know exactly why. After learning why people are putting them up, they began to design their own wind turbine blades. Through experimentation, they began to understand how the cost of putting up a wind turbine benefits people in the long run and how it can save you money in the future. They also experimented with designing the blades and understanding what elements work best to generate the most electricity.
- The students discovered the importance of the 'Improve' section on the Engineering Design Process. When cleaning an oil spill they cleaned the spill a lot better the second time around.
- The students enjoy the discovery of plant development. They have learned to record observations, and to include technical drawings of those observations.
- The students enjoyed all the activities.

- The students enjoyed designing vehicles to fit the different purposes.
- The students enjoyed exploring science topics with hands on activities.
- The students enjoyed most of the activities.
- The students enjoyed the building and observing of their Eco columns. I know that a great deal of the readings and discussions are also tied to the Core Curriculum.
- The students enjoyed the EiE Units. (2 responses)
- The students gained skill in using lab instruments. They also improved their observation and measuring skills. Students all improved their ability to analyze date and draw inferences. Overall, the students enjoyed working with the Carolina Mixtures, Compounds, and Elements unit.
- The students got to be involved in more hands on labs that they would not had the chance to do. They also view themselves as the scientist by using inquiry based labs and activities. They took pride in the lab/activities and wanted to learn more.
- The students had fun learning and experiencing STEM topics hands on. They increased their ability to explore including observation and recording.
- The students have a better understanding of what engineers do. They thought the engineering process was fun. When I asked them if they would be interested in pursuing a career as an engineer most students thought that it would be a great career.
- The students have become better high level thinkers.
- The students have become really excited about the robotics competition and from that have become more interested in looking at an engineering type career. Others have seen how much time it takes to create a small video game and have started to appreciate all the details that come in making their favorite games.
- The students have enjoyed seeing the instant gratification of change that comes from mixing chemicals, feeding animals, and watering their plants.
- The students have enjoyed the hands on approach to science and absolutely love the labs and research that they are able to conduct.
- The students have increased problem-solving abilities as a result of this STEM activity. They had to learn to problem solve by thinking several steps forward, instead of just the immediate effect.
- The students learned the stages of plant growth by observing the seeds germinate and grow.
- The students looked forward to and were excited about science class.
- The students love it! They want to come in during study halls and work on projects. They are excited about possibilities in engineering.
- The students loved the experiments and readings! (3 responses)
- The students saw how wind in motion really works and did some neat things with it.
- The students understood the impact of variables in their experimentation.
- The students use the engineering process lingo more comfortably now, as well as seem even more comfortable making mistakes. It seems they are not feeling their original idea/creation is a mistake, but rather something to "improve."
- The students used this program and now are more excited about learning through hands on activities. / The students now understand how lab work in class is also used in business daily.
- The students were excited and couldn't wait for this class period to begin! The students loved the hands-on and observations of each experiment.
- The students were excited when science class arrived. The class average for the students' Iowa Assessment national standard score was 177.9.
- The students were introduced to simple machines in our science curriculum. The STEM activity I chose to do with my students extended the students understandings of how simple machines are all around us and how they make our work so much easier.
- The students were made more aware of weather related terms.
- The students were more engaged due to the hands on activities.
- The students were more engaged in science and engineer then with any other traditional curricular materials that I had available.
- The students were more willing to test an idea, make modifications to the original idea, and retest until they were able to accomplish the outcome.
- The students were really excited to come to class and work on their projects. The students also kept telling about their interesting and asking what kind of jobs they would be able to do build and create things at.

- The students were very eager each lesson. The students became more inquisitive always looking for the why and how.
- The students were very excited each day to see what was going on with their caterpillar or butterfly. The loved the hands on activities.
- The students will go through the program after Christmas Break! I don't have any examples this early.
- The students worked together to problem solve. I saw students who typically were not engaged in science excited to come to class. It was interest and fun to see the growth of the students getting their cruisers to work.
- The third graders loved the rocks and minerals unit! It was hands on and they learned how to observe, test, and record observations.
- The unit provided many opportunities for students to write and think deeper about concepts. The kids had a hands-on experience with problem solving and learning.
- The videos showcasing a career in the STEM fields helped students to see past the classroom and to look at where these skills can take them in the future.
- The youth became very excited about the STEM activities we did. It was great to see their excitement for experiments.
- Their enthusiasm for science increased as they were able to test, gather results and give their own conclusions rather than going with what was in the book.
- Their eyes were opened to all the different kinds of engineering out there as well as how it involves not just math and science but other skills too.
- There seemed to be a lot of a-ha moments with the students. I think they all enjoyed the class, but many didn't think about what they were doing as science or engineering until we brought it up or they were asked about it.
- They became more aware of the similarities & differences in birds. They were able to share those similarities & differences in a group.
- They had more opportunities for hands on equipment that we previously did not have.
- They have a better understanding of engineering and technology.
- They learned how gears worked to make doing work easier.
- They love the hands-on learning! (3 responses)
- They were actively engaged throughout and were definitely made more aware of the variety of job opportunities available to them in the areas of science and engineering.
- They were engaged during most of our unit.
- This has provided us with quality science curriculum. Before, we were hitting random topics for brief time periods and did not have a curriculum to follow. These kits have provided us with quality materials that are carried over on a weekly basis and the concepts build off of each other each week. The kits had a lot of hands on ideas and materials, which is great for kindergarten students, and they were fun and at the kid's level!
- This program has really helped ignite interest in those students that fail in every other class. I have seen struggling students really become class leaders during PLTW classes!
- This program impacted my students greatly by engaging them in higher and deeper thinking. The students were challenged yet motivated and they were able to make decisions, predictions, outcomes and they were able to discuss their findings with each other. Communication is huge in first grade!
- This unit sparked an interest in the Great Wall of China. :) My students love to have hands-on opportunities to DISCOVER. This unit sparked a lot of interest.
- This was the second year that some of the students had worked with Lego robotics in the classroom. I was pleased on the advances the students made in year 2. There were continuing to search out additional ways to achieve the challenges.
- Through the HyperStream program we were able to expose the students to local companies with internship opportunities. We were successful in connecting two students to local companies for internships. / / Through the IT Olympics, our very talented students were challenged with learning new cyber security mechanisms and compete in the cyber defense program. This area of study was not one they had any prior experience with so it was something new and challenging for them in preparation for college.
- Topics were of high interest to the students, gained great vocabulary and opportunities for hands on learning.
- Total excitement with my first graders when the box of caterpillars arrived in our classroom. / Each first grader has taken complete responsibly in caring for their caterpillar.

- Touring the computer science department at the local college gave the students a chance to meet college professors and see the opportunities for them. Being involved in a competition taught accountability and had a tremendous impact on improving their communication skills.
- Two out of three of the participating in the club will go into Pre-Engineering at Kirkwood next year.
- Understand STEM concepts more during bell ringers.
- Very hands on. Kids loved it!
- Very hands on and developmentally appropriate.
- Watching the children learn new science vocabulary, along with watching the wonder in their eyes as a project was completed. Having the children realize that science can be fun, many times the children didn't even realize what they were learning they were retaining- they thought it was just a fun "play" activity.
- We currently do not have a science curriculum in kindergarten at the school, so that was a wonderful addition. My students LOVED doing science!
- We did not have an engineering project in our science curriculum in the past. The pinball unit was a great addition to teach this!
- We had a great time with the hands-on learning. The students were able to adapt the pinball machine parts to correct angles, etc. and learn firsthand cause and effect relationships.
- We have a fairly strong science fair program within our science department. The CASE class helped to provide more interest in the agriscience portion of the projects being prepared. The activities required a lot of teamwork which helped to foster better communication skills amongst the students. Most times teams have a tendency to be competitive in all activities. However, I saw that this curriculum fostered more of a sense of teamwork among all the students.
- We have had tremendous opportunities that would not have been afforded us had we not had Berkley Technology Services, Mrs. Tamara Kenworthy. The Prometheus evening was great fun, which caused Mrs. Amy Christensen to write a beautiful article in the Winterset Madisonian. I utilized our school paper to showcase opportunities for students in STEM. We have also brought attention to our Extended Learning Club due to the multi-media team.
- We have increased our females from 1 to 5!!!! In addition, we have several students who love to just hang out soak up the information even if they are not directly on a team. Opening the doors to opportunities and career awareness is the biggest impact I see right now.
- We were able to assist two high school students find summer internships which have had a very positive outcome for both the students and businesses. Female club members had the opportunity to present their HyperStream experiences to the TAI Board of Directors during the TAI Women of Innovation event in the fall of 2013. Three students participated in the cyber defense program at the IT Olympics in April 2014. This was a very exciting, challenging, and rewarding experience for the students and further confirmed their interest in related career paths.
- We were able to introduce kids to new concepts.
- We were able to really go further and deeper into our animal studies then we have ever been able to in the past. The excitement that STEM has brought to our school cannot be understated. It has changed the whole focus and culture of Science instruction in our school. Everyone is so excited about our new STEM program!
- When I have asked Discover 4-H participants who likes science, I'm lucky if half raise their hands. When I say that what we've been doing in Discover 4-H is science, along with math (another disliked subject) and engineering, some have a sort-of "a-ha moment" . I can see them making the conclusion that science and math don't have to translate to worksheets and tests, but can instead be interactive and fun.
- When talking about physical and chemical changes, the articles were very engaging and informative. The experiments were good, but the inquiry questions need to be changed so the experiment is more inquiry based.
- When we did the ratite relay, the students seemed very interested in ostriches and were able to recite facts after the meeting that they weren't able to do before.
- While not fully developed/exploited, we are located near a large university which offers a strong engineering program. It will be interesting to see if the Motion and Design unit inspires students to pursue STEM careers.
- While taking a "Brain Drain" break, we would go to the restroom and get a drink, then regroup to play a simplified version of a game, like sharks and minnows. While the students attempted to play the game, and using the EDP, we adapted and learned how to better play and improve on the game, while also having some fun.
- With all the hands-on experiences that the Carolina STEM program had, students were always engaged, and several mentioned how the "got it" when they could see it happen. Some commented that they felt like "real

scientists" because they wore goggles and got to mix chemicals and use a flame. When assessed, they certainly could explain their activity results better than before.

- Working with hands-students enjoy this and they had never be exposed to this so they really enjoyed
- Youth appeared to have enjoyed experiencing STEM in a non-school setting.
- Youth are excited about the STEM opportunities provided by the YMCA and Cass County Extension partnership. They ask if we are going to do more science programs. We asked some youth to demonstrate their balloon cars at the 4-H endowment pancake supper. Youth and their parents were excited to share their balloon cars.
- Youth participants have gained confidence and skills in STEM through the AWIM activities. Older youth mentoring younger members created a safe environment for youth learn share what they've learned. One parent shared that their child was gaining confidence in math and science classes in school.
- Youth were interested in finding out more about other countries and how kids there live. They began making a connection with the idea that science is more than a class in school, it was occurring around them every time they brainstormed an idea to solve a problem.

Description of unexpected results during implementation of Scale-Up programs (Positive or negative)

- 1. It was a surprise that the ambassadors wanted to meet weekly; this was a stretch for Extension staff to provide support. 2. In the middle of the year the Extension staff person that had been provide support resigned which limited the support Extension was able to provide the rest of the year. 3. We learned towards the end of the year that the ambassadors felt inexperienced working with middle school age youth. They also desired to have lesson plans to follow instead of trying to figure it out themselves. 4. Many of the youth don't have computer or technology access at home, so HyperStream was a good place for them to be afterschool to learn more. Several youth indicated more in creating and building machines and in STEM careers than at the beginning of the year. They were also more interested in math, science and computers.
- 2 students stopped coming, but a couple also joined us after learning what was going on.
- A great result of this curriculum is that our class is absolutely engaged from the beginning of class to the end of class. A negative of this is that the instructor spends a significant amount of time each day cleaning up for students because our class periods aren't long enough to allow for adequate clean-up time. A very positive result of this curriculum is that because it meets national science standards, I can offer this class for graduation credit being that I am endorsed in biology. This allows non-traditional students that have struggled in biology to take this hands-on interactive course which teaches biology through inquiry based activities rather than textbooks.
- A parent of one of our students informed us that the HyperStream experience and internship changed their son's outlook, behavior, and enthusiasm in a very positive way. They indicated that prior to HyperStream, their son was quiet, non-talkative, non-interactive, and not interested in much. Now their son is excited about school, going on to college, exploring different college programs, and pursuing his future!
- A random connection was made with a local alumnus who is an aerospace engineer. We were able to Skype in interview with him in Seattle, Washington. He said pictures of composite parts he was working on. Then a participant’s dad also worked on plane engines and he emailed me several pictures and details of a fighter jet he was working on. Participants got to see some cool current materials.
- A student who is otherwise not as motivated in the regular classroom, thrived in my after school program.
- Again, just the awareness of STEM opportunities that, in a rural community, may not be in the forefront of some of our student's thought process.
- All students were engaged and learned through this.
- All very positive, which can be unexpected with teenagers on any given day.
- An unexpected situation I experienced is I had students checking out of study hall to come in and use Autodesk inventor to design their own projects beyond what we were doing in class.
- Another grade level having the same kit.
- Around winter most students stopped attending and it never did pick back up.
- As always - more time would be great.
- As expected.
- As mentioned earlier, many students became tired of using the microscopes and making scientific drawings. The students also felt that content was lacking at times which I will fix next year through conveying more of the "teacher notes" to them.
- As stated before, there were many exclamations of "now I understand" and "that's cool, I wonder if I could do this at home". Students seem to be considering careers in the STEM areas now more than 5 years ago.
- As the teacher/sponsor in the building, I was surprised and pleased by the number of students that would talk to me in the hall and ask when the next HyperStream club meeting would be. The club has generated a lot of interest in our building. We had some students that would not attend regularly but would keep coming back.
- At first the different groups were trying a variety of different designs. Some of the designs were very complicated, but they were not meeting the different requirements. They were growing more and more frustrated. I told them the keep it simple and then experiment with different gear ratios. After they meet one of the requirements, they felt better about trying different ideas.
- At first the kids desired a more direct connection to agriculture, and then as we progressed through the units the connections were made without direct suggestions. The kids were able to think and process information deeper and with richer outcomes.
- At the beginning of the program, kids wanted to be in groups with their friends (it was a weekend and playing with friends was a motivator for them to attend). By the end of the program, they were mixing girls and boys and different grades without my doing it.

- At the time of my training and downloading software on all new computers, there was no technical support from my school. With a new program and an entirely new course load (this was my first year in this position), it was extremely frustrating to have to do it myself. Directions were not clear, and the companies were not able to help either. This problem has since been resolved.
- At times, the instructions were confusing as I worked to implement each exploration. All materials were readily available in the prepackaged kits! This was a great help!
- Because students were so eager to change variables with certain activities, we would sometimes (not all the time) run out of supplies and to supplement with other things available.
- Difficulty level.
- Don’t recall anything unexpected.
- Due to the multimedia portion, students are excited about making videos for the start of the new school year. The girls that joined this year now understand there is more to STEM and they can play an active role in the club.
- Everyone had a fantastic time.
- Everything is going just as planned with the material I was given.
- Everything went well.
- Faulty fuel cells were an issue and caused undue stress to some students.
- Found out we needed a couple more resources to make the project go smoothly.
- Getting a 3rd GTT class. We want to add another course but there are no offerings in Iowa as of right now.
- Girls were just as excited and actually did better in many projects than the boys.
- Great interaction between the students and some great thinking!
- Had great turnouts! Kids loved it all.
- Had to re-distribute kit materials/supplies to cover every grade level classroom.
- Had trouble with the cones and sticks staying in place to show how a lever can make work easier. Also, I used potatoes to lift in the STEM lab and they were difficult for the students to move on the boards which were not provided in the lab materials.
- How to keep students using materials appropriately or for task indicated.
- I can't think of any unexpected results.
- I changed my way of note booking and adapted to a better more appropriate way after attending the note booking PD.
- I did have some students that quit the program because they felt it was too time consuming and difficult for them. They did not want to put in all the time and effort it took for the projects to be presentable.
- I had a few teachers visit my classroom on occasion. They were impressed with what the students were doing and what they could accomplish.
- I had a student who broke the carbon sample from the element kit because he was trying to see how strong it was. I love his scientific curiosity!
- I had difficulty with shipping live organisms during the cold of winter. I had to have the WOWbugs replaced, and also had to replace the elodea with local aquarium plants because it froze while being shipped. I had to use the micro-projector for the spirogyra because of limited survivors. Again, I would just like to address the pacing. Our student population is very diverse with limited English abilities in nearly 60% of our population. While the hands-on activities provided these students with common experiences, the written articles required explicit instruction to aid comprehension. With an average of two to three articles per lesson, I found that it was difficult to even accomplish one lesson per week. The program ended up taking all of 12 weeks and I didn't even do the Animal Kingdom.
- I had not anticipated that my preschoolers would benefit so much from the writing and drawing opportunities in the program. They were able to use the worksheets to enhance their skills.
- I had students in the program that are generally unruly in class but they behaved very well in this program.
- I had students that were excited about the cyber defense unit, but with it not being ready until after the 1st of the year, these students dropped out.
- I had students who are usually bored in class become involved and interested. Students continuously asked what we would be doing next and looked forward to each day of class time.
- I had to wait quite a while for supplies to show up to implement my program, some activities I had to skip over and return to, because I didn't have the materials in time.

- I had two students move out of the district during the program. I also had some students with health issues who were not able to participate in the IT-Olympics at ISU.
- I have a group of girls that have taken the program and have just run with it. They come in any opportunity that they can and they have become my experts in my room. It has been a great confidence booster for them.
- I have made connections with community members that I will be able to utilize in the future to continue some of the experiences we had this year into the years to come.
- I have some specific recommendations to the service provider for more user friendly suggestions.
- I just have to stay organized to make sure that I re-stock the items used during the collaboration so that I have them the following year.
- I knew my time would be short but I didn't realize how much more time I could have used! There are MANY lessons/activities in the AWIM manual that I just did not have time for! I plan to use some of the lessons next fall as kick-offs!
- I need to figure out a way to change grouping procedures as students became a little bored working with the same people over an extended period of time.
- I think I've learned to not try to talk while they're working!
- I think the most unexpected thing that happened during implementation was the simple fact that students with IEPs no longer wanted to go to the resource room for additional help because they could work through activities at their own pace and could work in groups.
- I was a little concerned on how I would implement both SWH and STEM program, but it worked out better then expected. I was able to incorporate parts of the STEM program throughout various parts of the SWH process to either introduce or reinforce ideas.
- I was disappointed with the lack of risk taking the students used when designing their oil spill plans. I feel the cleanup task was a bit too scripted. I will do the tasks again, but will put more creative pressure on the students in the future.
- I was expecting my students to have more prior knowledge of mixtures. I was surprised how much they knew about electrical circuits.
- I was happy overall with how they worked in groups. Our homeschool children work in a group at home, but don't often have group dynamics with those they don't know well. I also emphasized getting to know one another’s' names and interests throughout the 6 weeks, so I think that also helped with the teamwork. I also was pleasantly surprised with their independent thinking. They may have gotten ideas from others, but no one copied anyone else’s' work.
- I was not able to use all the kits due to lower numbers.
- I was not expecting that some of the activities would be as challenging as they were for the younger (K-1st) kids.
- I was pleasantly surprised by the number of kids who stuck with the whole program.
- I was surprised at how challenging some of the activities we had our HS kids do turned out to be....this is not to say the activities were too challenging mind you...it was because our HS kids are not accustomed to doing STEM activities. We intend to change this.
- I was surprised by some of the students who gave up quickly and those that kept at it.
- I was surprised that a majority of the girls were far more comfortable going through the engineering process and creating their projects than the boys. They were confident and shared many ideas. It was also unexpected that even though we met weekly, each time I came to programming the students were very excited to start the project, even as the weather was good to be outside playing as an option.
- I was surprised that we didn't lose more specimens from start to finish. I expected more deaths.
- I was surprised to hear students take their discussions about healthy food into the topics of locally grown, organic, etc. foods. The students considered environmental impact of food rather than just nutritional impact of food on themselves.
- I was very impressed with this STEM unit. However, I did feel it took much longer than I had to spend on patterns. Patterns are just one unit we needed to get through. It took much longer than this grade level had previously dedicated time to in the past years.
- I would like the curriculum to be more user friendly in informal education opportunities - like after school. I would like the curriculum to more at 4-5th grade level -- especially the gravity cruiser.
- I would like to have more time for the improvement phase, but did not. One 4th grader told his mom and dad that he wanted to be an engineer.

- In a recent study from the Girl Scout Research Institute, we learned that girls have an interest in STEM activities and careers but they need to see role models like themselves in order to consider careers in STEM fields. While we knew this through our research, I did not expect to walk away from these activities with so many girls reporting an interest in working in a STEM related, specifically engineering, field from a one day opportunity.
- It created more questions as they went through the lab work. Students wanted to do "other" experiments that the ones provided in the lab book so that they could answer their questions.
- It is amazing to see the innovation that happens during programs like EiE. We did a lesson on windmills, and several of the windmill blade designs were very impressive. Also, it is a delight to see how excited these kids get to share with others what they've created.
- It really showed me who really understood the reason why you change an existing creation. Some changed it for the better and a few still didn't do anything to make it more useful.
- It was neat to see the "light bulb" go off connecting subjects and content.
- It was tough getting through all the material I wanted to.
- It was wonderful to see the kids wait in line for their turn to create and experiment.
- It will get kids interested in Science and Science careers.
- It's my second year, so I anticipated future troubles and was able to clarify before the problems arose.
- Just interesting to see the group of boys in grades 6-8 work on the robots outside of class because of their interest. It gave me a chance to see things they are good at that I would not have normally seen.
- Just lack of transfer between former instructor and new instructors (bad communication, follow through, etc).
- Lab materials require a large room for storage, especially the small greenhouse included in my kits. I was limited for space this year, so storage was difficult.
- Lack to time to cover all of curriculum!
- Light bulbs do not hang at the correct height in the light boxes when using the black paper inserts with slits (for use with prism).
- Many of the students caught-on to the 3D computer program, Autodesk Inventor, more quickly than I thought they would. They were eager to help other students. They also enjoyed designing and creating new ideas when they had extra time.
- Many parents, other teachers, other students, and administration passed by lessons and made positive comments about student engagement, materials, and learning.
- Members of the 4-H HyperStream club were from two counties. Many of the youth didn't know each other at the beginning of the year. As they worked in teams, they had to learn to interact and work as teammates to accomplish tasks such as constructing and programming robots. / The field trip to Fareway Distribution Center was an unexpected addition to our plans. / As I visited with one of the volunteer leaders towards the end of the year, he was desires having more of a collaborative and teaching roll with the ambassador mentors in the future. / The facility we ended up using was large enough, but electrical outlets were limited requiring numerous extension cords to run computers. We also had to set up and take down tables every time.
- More hands on interactive.
- My kids are far more able to work as a team in working towards a common goal. They took their roles seriously and were able to accomplish a lot together. The whole idea of working like that is far less intimidating to them and they were able to see that everyone has a role that is vital in the success of the whole group. Many times we have just one student doing everything and the others just observe. This was not the case with the kit we were using.
- My science students really embraced the process. They learned how to cooperate and work together!! STEM is really awesome!
- My special ed students absolutely excel during these activities!
- N/A.
- Negative: grumbling about the journaling / Positive: some students that were reluctant to be involved in class, even in activities, responded positively.
- Nichrome wire in the Making a Filament lab was supposed to glow. Wire got warm, but did not glow.
- No.
- None. (14 responses)
- None really.
- Not all living organisms were able to make it to their aquariums.

- Not really anything.
- Nothing other than what has already been mentioned.
- Oddly enough, as we were wrapping up our STEM/Engineering study, my students began an action research project in English. They were able to make great connections between that process and the engineering process!
- On the positive side they wanted to keep trying until they were successful.
- One of the topics introduced in the lab module was a math application with velocity, acceleration, etc- many of my students struggle with this, but I noticed that they performed better on assessments with this application and when making line graphs. They were involved in collecting the data and understood how to show it in various ways. I was pleased to see this!
- One student did drop out of the program because it was an optional after school activity. It was originally going to be part of our gifted program but we made it available to all fourth graders. The struggling students actually were the ones who showed the greatest interest in the program.
- One student kept saying that his car traveled slowly and that's why it crashed the best. He also drew his car and explained the same thing.
- One third grade class was unable to handle occasionally working without direct supervision--as I floated between groups and therefore we had to stop the program before we had finished.
- Originally, there had been plans to use two strands of the Hyperstream program: game design and robotics. We integrated the robotics portion but ultimately, the game design portions, which is centered around writing code, did not get off the ground as we found a better way to offer coding to our students. (Instead of using Alice, we'll offer Python and Java).
- Positive experience at the Southeast Iowa STEM festival.
- Positive: I saw some students thrive in this sort of setting, and demonstrate creative thinking within their small groups, working beyond my expectations! I don't know if it was because they had so much extra time in hands-on activities, &/or the collaborative process which enriched them the most!
- Positive: Students were excited for science lessons. Negative: had to redistribute kit materials with grade level partners to have enough for each classroom.
- Realized...after first lesson...that if students miss a previous session (particularly the first two sessions), they have a hard time catching up (we cannot always spare a staff member to explain individually what they missed).
- Running some of the activities for the first time was a bit of a challenge and keeping up on supplies, not always knowing what I was going to need for activities beforehand.
- Several students continued the ideas presented in the module and based their science fair projects on them!
- Since the curriculum is more hands-on and lab based, not all the labs turned out as expected this first time. However, since this is more problem based, the students were still able to use the "failures" as learning opportunities and discover why it didn’t work as planned.
- Snails died quickly!
- Snow delays, school cancellations, room temperature.
- Some animals didn't make it so we had to have the life and death talk. Talks about safety and animals.
- Some of plants did not grow properly, some days we had to spend more time on one lab or section because we messed up the first time around, but used it as a learning experience.
- Some of the animals did not survive long because of harsh shipping conditions. (It was extremely cold) However, the animals that did survive are almost all still alive. The millipedes were the one animals that we lost the most of right away, but all that were still alive are currently alive. So when they are alive and healthy when they arrive, they survive well in the environments suggested by STEM.
- Some of the directions in the teacher guide were not specific.
- Some of the experiments didn't have the end results that were expected, because they just didn't work. So we changed them a bit to get them to work. The magic cube experiment, the cubes were very small and difficult for everyone to work with. On the whole I feel it was a successful program, even though some of the experiments had to be changed slightly to get them to work.
- Some of the students I thought would excel at a project like this, really didn't enjoy it. Others I thought would struggle with a project like this really did well with it.
- Some students stated that they thought "building bridges" was going to be boring, but they found out that they really liked the activities and for at least one student, it was the "highlight of the year."

- Some were leaders and wanted to do it all themselves, they were interested; others just stayed back and watched.
- Sometimes the vehicle wouldn't work and they were frustrated until they took a day and looked at it again.
- Sometimes, students were able to take what they learned and connect to real-world happenings.
- Started out with 13 students and ended the year with 6.
- Struggled with student view.
- Student allergy questions. We had to contact the company about ingredients in the kit.
- Student groups challenged each other to find more creative ways for their project. They also supported each other when problem solving by sharing information across groups.
- Students building and trying to solve things on their own; Students asking themselves how they could change something to make it better.
- Students enjoyed and liked learning and doing labs and even students with behavior problems were engaged and enjoyed the labs and activities developed by case.
- Students expressed excitement and said "We should do this every day". "Time went by so fast."
- Students had lots of questions that I couldn't answer!
- Students learned that sometimes we all make mistakes even the teacher. In one lab I did a quick demonstration of what they will be doing and I ended up spraying water all over the place. They all laughed as I informed them that is what they are not to do.
- Students loved science and did a great job of staying on task during this unit!
- Students not taking lab work and experiments as serious as needed.
- Students seemed to try a little harder in the CASE class compared to my other classes.
- Students started looking into how we can help others around the school and our community using the technology and skills that they were learning through our PLTW: Gateway to Technology classes.
- Students were highly engaged during STEM activities. STEM activities also increased excitement and interest in STEM careers.
- Students were very engaged in the actual activities but did not remember much about what was discussed.
- Subjects were not taking as long as mentioned in the curriculum so sometimes I didn't feel prepared since we would get done ahead of time.
- Takes more time to prep and lesson time is longer than what was printed in the curriculum.
- Teachers from other grade levels became excited about the program and wanted to learn how they could get STEM programs into their classrooms.
- Teamwork.
- Teamwork, communication outcomes by having students showcase what they learned.
- The activity Sheddy Betty Freddy did not work with the students and was not able to be recreated with other materials. The glue was very chunky.
- The arrival of our kits.
- The AWIM curriculum helped my students develop team building skills. Many of my students struggle with perfectionism. Forcing them to work in small groups greatly improved their cooperation skills.
- The day of the challenge, cruisers that had previously went 24 feet only went 18 feet and a couple did not go at all. It made for a very interesting conversation about why that may have occurred.
- The day we made the rain gauges, it rained so we were able to measure the rain and record the results. A student asked if we could use the thermometers to check the temperature of the rain and compare that to the air temperature, so we did that as well which extended the lesson. It's fun to see the students think like scientists!
- The documentation is negative and time consuming. It needed to be sent all up front at the very beginning. We received some old computers that helped our multimedia team. These came from Berkley Technology Services.
- The EiE kits and the GWAEA training are wonderful. It would be more economical to rent the EiE kits from the GWAEA VAST Center ($65 per kit) than to purchase them from the Museum of Science Boston ($200 per kit). The VAST Center EiE kits and the EiE kits from the Museum of Science Boston are both single use kits and have to be restocked the next year in order to be used again.
- The group was 5th through 10th graders...and I was pleasantly surprised to see they could all handle the material. Sometimes the 10th grader was helping the younger ones. Sometimes the 7th grader was helping the 10th grader. They were so willing to work together and take time to show each other what they had figured out so the whole group could progress.
- The infinite possibilities of cross curricular work within our building and district. What a great thing!

- The kids did not have some of the background information that I had expected them to have. It made a few of the lessons harder than I had anticipated.
- The labs could get messy so my class had to establish clean up routines that took extra time away from the learning. As we got into the lessons, this seemed to motivate the students to volunteer to be "lab partners" for material pass out and clean up. The kids talked about "lab days" with excitement. They wrote about what they were learning, not only in their science notebooks but also in their writing journals. It also sparked several discussions about careers in STEM related fields like hydrologists and climatology. For my children who are growing up in poverty, this is HUGE!!! Before this year, they did not think about what kinds of jobs they could get and which science fields they were interested in. A wonderful opportunity to explore possibilities for all. Thank you on behalf of my students-this makes a difference in their lives!
- The lessons take longer than indicated.
- The only unexpected was that the students said more structured lessons on ALICE would be very beneficial before getting started. We offered video tutorials and websites that had support articles, but they wanted a more structured learning experience with the program first before they started to explore and work on their own.
- The participants wanted to take the pinball kits home to further work on and modify them. They were very enthusiastic about what game they had created.
- The pasta in the To the Rescue kit actually didn't break like it was expected to throughout the entirety of the workshop.
- The projects and teaching in the classroom almost always took longer than expected. A few students really struggled to keep up.
- The PTO purchased the school microscopes to go along with this unit and that has been showcased throughout the school.
- The spills that we had on our carpeted room. I need a tile floor when working with the stream tables.
- The student excitement was great!!
- The student interest that I have seen was somewhat unexpected, but very positive.
- The students understood that design and motion involved more than drawing and movement.
- The students wanted to work on their designs and projects all of the time. It was hard telling them that they had to wait until Science to work on it. The students had trouble not losing any pieces and using just the supplies given.
- The students were very curious about the contents of the red boxes containing the kit. They were immediately enthusiastic to try new things.
- The team provided the mentors for starting up a new 4-H Technology club in providing leadership to building and operating SeaPerch underwater robots that led to a six county Western Iowa 4-H Pilot project of starting up 4-H Aquatic Robotics Clubs which will do water quality testing and research which is becoming a very important topic for Iowa watersheds with the pledge to reduce by 45% the amount of Nitrogen and Phosphorous entering the Mississippi and Missouri Rivers from Iowa Watersheds.
- The thermometers in the kit were poor quality. They weren't accurate & broke easily.
- The track is difficult to keep in place, but we made it work.
- The tremendous growth in membership this year.
- The unit has gone smoothly and students were excited to show their findings to others.
- There was a lesson that didn't work correctly, but it turned into a good questioning day. Students were wondering and investigating how to alter the procedure steps to make it work. We never were successful, but students were investigating and working together to try to solve the problem. So it wasn't a wasted lesson.
- There were many positives that happened thanks to this grant and this program. I believe this program will have a continuous impact on my students.
- There were some great student conversations with them helping each other with a concept.
- They did struggle with some of the problem solving.
- This has been a great year in STEM! It's been great to see their "engineering minds" develop and to see how excited they have been to do the EiE and other challenges! The most surprising thing for me has been to see how lacking many students are in the collaboration skills involved in STEM projects. Seeing the lack of these skills has shown me that we need to give our students many opportunities to work with peers and improve those skills. STEM is an excellent situation to work on developing those skills.
- Time management is a struggle with this group of students. I ended up "firing" two of the kids in the group for not turning their logo and slogan in on time. I did not remove them from the group but some.

- Times were very hard to coordinate with a business and I became a sort of mentor to the youth from my past experience in multi-media design. However, I was hoping to get the youth more connected with local STEM businesses who would also be interested in what the youth were working on.
- Transformer housings pulled apart on six units. Motors aren't strong enough to power some simple gear combinations when using a larger driver gear.
- Two students were able to meet with the Governor and Lt. Governor in Corning and present their skimmers.
- Unexpected results...when we did the last activity and were supposed to see how heavy the students could make a car before it knocked over the wolf, we were never able to make the car light enough, even when we moved the ramp to the lowest setting with no extra weight, to keep the wolf standing. We just discussed that sometimes in science with experiments, things happen that we don't plan on happening, and that's ok too!
- Unexpected: Use of 3D printer in implementation was a big part of my program.
- Very good results. We were able to adopt out all of our frogs, millipedes and crabs to families of our students. Many of these are doing very well in their adopted homes!
- Vocabulary development....I was impressed by their use of new words as they explained what they learned during the unit of study.
- We are a SNA school for reading and math. The activities we went through offered extra help on these topics for student intervention.
- We did not expect that a pilot would ask us to ride in his small plane. Sorry to say the school insurance would not allow this. However, we plan to go see the plane at the hanger. Next year I want to encourage other classrooms to get involved in the STEM projects. Thank you for allowing us to be part of this wonderful program.
- We did not have enough battery holders and light bulb sockets for each class that I teach when it came to wiring the house, our last lesson. Students began problem solving on what they could use if they did not have one and even came with their own materials or built one with other materials. Great problem solving!
- We found live maggots in the owl pellet activities. This was quite alarming, but the students handled it well.
- We found that very low-achieving students excelled in this STEM course.
- We had a few low functioning (special education) students on our team which presented a challenge, but our high functioning students worked patiently with them and learned tolerance and compassion.
- We had animals die before ecocolumns were polluted.
- We had one of the programs downloaded incorrectly on the computers and then ended up having it not work. This was not a big deal and our tech guy just re-downloaded it, but it did cause some frustration on my end.
- We had trouble keeping our fish alive before the ecocolumns were even polluted.
- We have also attention to our Extended Learning Club due to the multi-media team's efforts. More parents and grandparents are networking with us. We are receiving feedback from them due to their posts or congratulations.
- We have had a very good year with STEM! The students LOVE STEM class and the various challenges we have worked on. Overall, I have been surprised at how many of the students lack the ability to work well with their peers in groups. Seeing this has reinforced the need to give them opportunities to develop those important skills. STEM provides another way to offer them situations in which they need to work positively with others.
- We loved the ash fall lab! The hands -on activities really helped the students make connections and learn the content. Next year, after I've run through the labs, I look forward to even better understanding!
- When I first looked at the Eie texts they seemed very wordy and had few pictures for 2nd grade. I broke the book into parts for lessons. The students really enjoyed the book and would ask when we are going to finish that book.
- When we were doing a lab I would take pictures and post them on Facebook. The parents enjoyed seeing them and it was an avenue for them to discuss science at home.
- While using the thermometers the water was too warm and it melted some of the thermometers. Overall, students enjoyed the unit.
- Wish we had something better to store the pieces other than a bucket.
- Working with a Hispanic population in one of my groups, I could see that the girls tend to sit back and let the boys take over. When I paired girls with girls, they blossomed.

Appendix Q: Regional Scale-Up Program_Student Surveys

Student Survey

Scale-Up STEM Interest (POST) – Middle/High School Range

The following questions are about your interest in science, technology, engineering, and mathematics. You do not have to answer the questions and you can stop at any time. If you decide to stop, your grades will not be affected and you will not face any consequences. Please sit quietly until your classmates are finished.

1. Are you… _________ Male (Boy) _________ Female (Girl)
2. How old are you? _________ Years

Compared to the beginning of the (semester/program/etc.), are you more interested, just as interested, or less interested now in each of the following?
Place an "X" in the box to mark your answer.

	More interested now than before	Just as interested now as before	Less interested now than before
3. Math			
4. Science			
5. Computers and technology			

6. Compared to the beginning of the (semester/program/etc.), are you more interested, just as interested, or less interested in designing, creating, and building machines and devices (also called engineering)?
   1 More interested now than before
   2 Just as interested now as before
   3 Less interested now than before

7. Compared to the beginning of the (semester/program/etc.) are you more interested, just as interested, or less interested in someday having a job that uses skills in science, technology, math, or engineering?
   1 More interested now than before
   2 Just as interested now as before
   3 Less interested now than before

Student Survey

Scale-Up STEM Interest (POST) – Elementary School Range

These questions ask about your interest in science, computers, and math. You do not have to answer the questions. You can stop at any time. If you decide to stop, nothing bad will happen. If you choose not to answer the questions, please sit quietly until everyone is done.

1. Are you… _________ Boy _________ Girl

2. How old are you? _________ Years

3. Think about how interested you were in <u>math</u> in the fall. Are you more interested in math now, just as interested in math now, or less interested in math now?

   1 I am more interested now
   2 I am just as interested now
   3 I am less interested now

4. Think about how interested you were in <u>science</u> in the fall. Are you more interested in science now, just as interested in science now, or less interested in science now?

   1 I am more interested now
   2 I am just as interested now
   3 I am less interested now

5. Think about how interested you were in using <u>computers</u> in the fall. Are you more interested in using computers now, just as interested in using computers now, or less interested in using computers now?

   1 I am more interested now
   2 I am just as interested now
   3 I am less interested now

6. Think about how interested you were in <u>designing, creating, and building things</u> in the fall. Are you more interested in creating things now, just as interested in creating things now, or less interested in creating things now?

   1 I am more interested now
   2 I am just as interested now
   3 I am less interested now

7. Are you more interested now, just as interested, or less interested in having a <u>job</u> that uses science, math, and computer skills?

   1 I am more interested now
   2 I am just as interested now
   3 I am less interested now

<u>Student Survey</u>

Scale-Up STEM Interest (POST) – Early Elementary School Range

These questions are about your interest in science, computers, and math. You do not have to answer the questions. You can stop at any time. If you decide to stop, nothing bad will happen. If you choose not to answer the questions, please sit quietly until everyone is done.

1. Are you… _________ Boy _________ Girl
2. How old are you? _________ Years
3. Think about how much you liked <u>math</u> in the fall. Do you like math more now, about the same, or less now?

    1 ☺ I like it more now

    2 😐 I like it the same now

    3 ☹ I like it less now

4. Think about how much you liked <u>science</u> in the fall. Do you like science more now, about the same, or less now?

    1 ☺ I like it more now

    2 😐 I like it the same now

    3 ☹ I like it less now

5. Think about how much you liked using <u>computers</u> in the fall. Do you like using computers more now, about the same, or less now?

    1 ☺ I like it more now

    2 😐 I like it the same now

    3 ☹ I like it less now

6. Do you like to <u>design and build things</u> more now, about the same, or less now than you did in the fall?

    1 ☺ I like it more now

    2 😐 I like it the same now

    3 ☹ I like it less now

7. Are you more interested now, about the same, or less interested in having a <u>job</u> that uses science, math, and computer skills?

    1 ☺ I like it more now

    2 😐 I like it the same now

    3 ☹ I like it less now

Appendix R: Regional Scale-Up Program_Student Survey item frequencies

The frequency tables for all questions in the student survey are presented in the order they appear in the questionnaire. The subgroup data included in the frequency tables are presented as descriptive statistical summaries. Between-group analyses were conducted to determine which (if any) of the subgroups differed from one another based on inferential statistical tests. Significant differences are noted with an asterisk (*) where p<0.05 or a double asterisk (**) where p<0.001, respectively.

E1.	**Are you…___Boy ___Girl**				
MS/HS1.	**Are you…___Male (Boy) ___Female (Girl)**				
			Education		
Response Options	n	Total %	Elem %	Middle School %	High School %
Male	11,002	51.8	50.6	51.5	54.4
Female	10,248	48.2	49.4	48.5	45.6
Total	21,250	100	--	--	--

E2.	**How old are you? ____ Years**	
MS/HS 2.	**How old are you? ____ Years**	
Response	n	Total %
4	53	0.3
5	213	1.0
6	880	4.2
7	1,532	7.3
8	1,640	7.8
9	1,965	9.3
10	2,057	9.7
11	2,256	10.7
12	2,516	11.9
13	3,223	15.3
14	3,221	15.2
15	746	3.5
16	373	1.8
17	270	1.3
18	179	0.8
19	5	0.02
Total	21,129	100
No response	221	--

E2.	**How old are you? ____ Years**			
MS/HS 2.	**How old are you? ____ Years**			
			Gender	
	Sub-group	Total	M	F
Subgroup	n	%	%	%
Elem (4-10y)	8,340	39.5	38.5	40.4
MS (11-13y)	7,995	37.8	37.7	38.1
HS (14-19y)	4,794	22.7	23.8	21.4
Total	21,129	100	--	--
No response	221	--	--	--

E3. **Think about how interested you were in math in the fall. Are you more interested in math now, just as interested in math now, or less interested in math now?**

MS/HS 3. **Compared to the beginning of the (semester/program/etc.), are you more interested, just as interested, or less interested now in [Math]?**

			Gender		Education**		
Response		Total	M	F	Elem	Middle School	High School
Options	n	%	%	%	%	%	%
More Interested	8,067	38.0	38.3	37.7	54.5	30.3	22.1
Just as interested	10,069	47.5	46.6	48.5	31.4	55.4	62.7
Less interested	3,068	14.5	15.0	13.8	14.0	14.3	15.2
Total	21,204	100	100	100	100	100	100
No Response	146	--	--	--	--	--	--

E4. **Think about how interested you were in science in the fall. Are you more interested in science now, just as interested in science now, or less interested in science now?**

MS/HS 4. **Compared to the beginning of the (semester/program/etc.), are you more interested, just as interested, or less interested now in [Science]?**

			Gender		Education**		
Response		Total	M	F	Elem	Middle School	High School
Options	n	%	%	%	%	%	%
More Interested	11,781	55.6	56.5	54.5	67.6	52.1	40.4
Just as interested	7,540	35.6	34.7	36.4	24.4	38.9	49.7
Less interested	1,886	8.9	8.8	9.0	8.0	9.0	9.9
Total	21,207	100	100	100	100	100	100
No Response	143	--	--	--	--	--	--

E5.	Think about how interested you were in using computers in the fall. Are you more interested in using computers now, just as interested in computers now, or less interested in computers now?
MS/HS 5.	Compared to the beginning of the (semester/program/etc.), are you more interested, just as interested, or less interested now in [Computers and Technology]?

			Gender**		Education**		
Response Options	n	Total %	M %	F %	Elem %	Middle School %	High School %
More Interested	11,600	54.8	59.5	49.9	68.7	50.0	38.8
Just as interested	7,492	35.4	32.1	39.0	24.5	39.4	48.0
Less interested	2,063	9.8	8.4	11.1	6.9	10.6	13.2
Total	21,155	100	100	100	100	100	100
No Response	195	--	--	--	--	--	--

E6.	Think about how interested you were in designing, creating, and building things in the fall. Are you more interested in creating things now, just as interested in creating things now, or less interested in creating things now?
MS/HS 6.	Compared to the beginning of the (semester/program/etc.), are you more interested, just as interested, or less interested in designing, creating, and building machines and devices (also called engineering)?

			Gender**		Education**		
Response Options	n	Total %	M %	F %	Elem %	Middle School %	High School %
More Interested	12,564	59.4	64.6	54.0	71.9	57.1	41.6
Just as interested	6,754	31.9	29.3	34.8	21.7	34.4	45.9
Less interested	1,825	8.6	6.2	11.2	6.4	8.5	12.6
Total	21,143	100	100	100	100	100	100
No Response	207	--	--	--	--	--	--

E7.	Are you more interested now, just as interested, or less interested in having a job that uses science, math, and computer skills?
MS/HS 7.	Compared to the beginning of the (semester/program/etc.) are you more interested, just as interested, or less interested in someday having a job that uses skills in science, technology, math, or engineering?

			Gender**		Education**		
Response Options	n	Total %	M %	F %	Elem %	Middle School %	High School %
More Interested	9,557	45.4	48.7	42.0	53.3	41.2	38.7
Just as interested	8,786	41.8	40.1	43.6	30.8	47.9	50.8
Less interested	2,689	12.8	11.3	14.4	15.9	10.9	10.5
Total	21,032	100	100	100	100	100	100
No Response	318	--	--	--	--	--	--