# STEM Scale-Up Program
# Menu for 2019-2020

# GREATNESS®
# STEMS
# FROM IOWANS

## GOVERNOR'S STEM ADVISORY COUNCIL

# 2019-2020 STEM Scale-Up Program Menu

**Description:** Stimulate actual concepts and situations found in the food science and safety industry. This course offers hands-on activities, projects and problems in areas of food safety, chemistry, processing, product development and marketing.
**Grade Level:** 9-12
**Contact:** Joshua Remington, Iowa FFA Foundation, joshua.remington@iowaffafoundation.org
**For more information**: https://www.case4learning.org/index.php/curriculum/case-courses/food-science-and-safety

**Description:** Inspire students as they build their own websites, apps, games and physical computing devices. This course takes a wide lens on computer science by covering topics such as programming, physical computing, HTML/CSS and data.
**Grade Level:** 6-10
**Contact:** Samantha Dahlby, NewBoCo, samantha@newbo.co
**For more information:** https://newbo.co/code-org-partnership/

**Description:** Foster equity and diversity in the classroom, breaking down barriers and stereotypes around computer science. This course is designed to be flexible for the classroom.
**Grade Level:** K-5
**Contact:** Samantha Dahlby, NewBoCo, samantha@newbo.co
**For more information:** https://newbo.co/code-org-partnership/

**Description:** Introduce students to the foundational concepts of computer science and challenge them to explore how computing and technology can impact the world. This course is a rigorous, engaging and approachable exploration of the foundational ideas of computing.
**Grade Level:** 9-12
**Contact:** Samantha Dahlby, NewBoCo, samantha@newbo.co
**For more information:** https://newbo.co/code-org-partnership/

**Description:** Engage learners in collaborative, student-directed projects that build creative problem-solving and engineering design skills. This course is designed to teach the value of collaborating to solve complex, modern problems and create a strong foundation for future STEM learning.
**Grade Level:** 9-12
**Contact:** Cheryl Farmer, University of Texas at Austin, cheryl.farmer@mail.utexas.edu
**For more information:** http://engineeryourworld.org/

**Description:** Create new and worthwhile ideas while exploring light to create shadows through creativity and innovation. This course encourages teachers to re-envision their classroom, routines and schedules to optimize students' learning.
**Grade Level:** PreK-2
**Contact:** Beth VanMeeteren, University of Northern Iowa, beth.vanmeeteren@uni.edu
**For more information:** https://regentsctr.uni.edu/

**Description:** Engage students through making and tinkering and build conceptual understanding around academic content. This course is designed to empower teachers to cultivate engaging, purposeful and successful extensions of already developed curriculum.
**Grade Level:** K-8
**Contact:** Jolie Pelds, Science Center of Iowa, jolie.pelds@sciowa.org
**For more information:** https://www.sciowa.org/scaleup

**Description:** Engage and inspire young minds to explore scientific phenomena. This course is designed to build science understanding and respond to the ever changing interests and abilities of children.
**Grade Level:** PreK-2
**Contact:** Jolie Pelds, Science Center of Iowa, jolie.pelds@sciowa.org
**For more information:** https://www.sciowa.org/scaleup

**Description:** Incorporate three-dimensional learning with an emphasis on authentic hands-on, problem-based learning. This course follows the Engineering Design Process of defining the problem, planning solutions, making a prototype, reflecting, communicating results and redesigning.
**Grade Level:** PreK-5
**Contact:** Karen Achtemeier, National STEM Business Development Manager, kachtemeier@hand2mind.com
**For more information:** https://www.hand2mind.com/brands/stem-in-action

**Description:** Transform the classroom into incubator spaces where student teams solve real-world problems alongside industry mentors. This course prepares students with the skills and mindset to persist in STEM education, pursue STEM careers and become innovators of the future.
**Grade Level:** 6-12
**Contact:** Leslie Flynn, University of Iowa, leslie-flynn@uiowa.edu
**For more information:** https://jacobsoninstitute.org/STEM-Innovator

# Curriculum for Agricultural Science Education (CASE) – Food Science and Safety
## 2019-2020 STEM Scale-Up Program

**Grade Levels**: 9-12, available in school

**Website:** https://www.case4learning.org/index.php/curriculum/case-courses/food-science-and-safety
**Video Link:** https://www.youtube.com/watch?v=8MK0bPAq3Tw&feature=youtu.be

## Award Provides:
- Two-week professional development held during the summer.
- Lodging, most meals and materials for professional development.

## Additional Cost(s) to Awardee In 2019-2020:
- Travel expenses to and from professional development

## Approximate Sustainability Cost After Award Period:
- Approximately $450 to operate the program annually after the initial award year.

## Program Summary:
Food Science and Safety is a specialization course in the CASE Program of Study. Students will complete hands-on activities, projects, and problems that simulate actual concepts and situations found in the food science and safety industry, allowing students to build content knowledge and technical skills. Students will investigate areas of food science including food safety, food chemistry, food processing, food product development, and marketing.

**Food Science and Safety includes the following units of study.**
- Introduction to Food Science
- Chemistry of Food
- Safety of Our Food
- Food Processing Preservation and Packaging
- Food Health and Security
- Preference and Product Availability
- Food Product Development

CASE utilizes science inquiry for lesson foundation and concepts are taught using activity-, project- and problem-base instructional strategies. In addition to the curriculum aspect of CASE, the project ensures quality teaching by providing extensive professional development for teachers that leads to certification.

## Requirements to Implement the Program:
- Attend two weeks of CASE Curriculum Institute (dates and locations will vary).
- Travel expenses to and from the Curriculum Institute which are outside the award.
- Secure equipment and supplies to teach CASE course above the award allocation.
- Commit to adopt and teach CASE curriculum upon return from institute (2019-2020 school year).

## Professional Development:

**Duration:** 9 day workshop
**Date(s):** June or July 2020 – Course scheduled will be released in October 2019
**Location:** Central Iowa

**STEM Scale-Up Program Application Link:** www.IowaSTEM.gov/Scale-Up-Application

# Computer Science Discoveries
2019-2020 STEM Scale-Up Program

**Grade Levels**: 6-10, available in school

**Website:** https://newbo.co/code-org-partnership/
**Video Link:** https://youtu.be/2-QpgNHknds

## Award Provides:
- Curriculum by Code.org.
- Connections with other Iowa computer science teachers through in-state support network.
- Opportunity to earn licensure renewal or graduate credit through Keystone AEA.
- Ongoing support during implementation from NewBoCo staff, facilitators, and online forums.
- Travel stipend of $50 per workshop day.
- Per diem stipend of $60 per workshop day for teachers' time.
- $100 to cover classroom supplies.
- Full Circuit Playground Classroom Kit for Unit 6.

## Additional Cost(s) to Awardee In 2019-2020:
- None

## Approximate Sustainability Cost After Award Period:
- The curriculum is free forever. Estimated classroom supply costs are $100 per class, with some supplies that can be reused year after year.

## Program Summary:
Computer Science Discoveries is appropriate for 6 - 10th grade students and can be taught as a semester or year long introductory course (3-5 hours per week of instruction for 9+ weeks). The course takes a wide lens on computer science by covering topics such as programming, physical computing, HTML/CSS, and data. The course inspires students as they build their own websites, apps, games, and physical computing devices.

NewBoCo's year-long Professional Learning Program provides ongoing support for teachers, requiring no prior computer science experience to get started. The curriculum and workshops are also designed to foster equity and diversity in the classroom, breaking down barriers and stereotypes around computer science.

In addition, the curriculum is available online at no cost for anyone, anywhere to teach. For more information about Code.org's goals and approach to their courses, please visit their website for curriculum values and professional learning values.

## Requirements to Implement the Program:
**Educator(s) must participate in all nine workshop days throughout the year and also submit a Code.org application (in addition to the STEM Scale-Up application) at** https://newbo.co/code-org-partnership/#apply**.**

**A memorandum of understanding signed by the building administrator is required before training or materials can be delivered.**

## Professional Development:
A five-day summer workshop will be held July 15-19. Location is yet to be finalized. Four, one-day Saturday workshops will be held during the academic year.
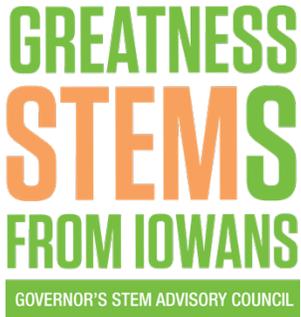
**Duration:** 1 week, plus four 1-day Saturday workshops
**Date(s):** July 15-19, 2019
**Location:** Final location TBD, with alternative academic year locations available in Decorah and Dubuque.

## Information Session:
To learn more about this program and have questions answered, please join a virtual information session on Thursday, January 31st at 7:30am via Zoom. You may join via your computer at https://zoom.us/j/367460226 or call in from your phone at +1 646 558 8656 with the meeting ID: 367 460 226. Contact your STEM Region manager for a link to the recording if you are unable to attend.

**STEM Scale-Up Program Application Link:** www.IowaSTEM.gov/Scale-Up-Application

# GREATNESS STEMS FROM IOWANS
GOVERNOR'S STEM ADVISORY COUNCIL

# Computer Science Fundamentals
## 2019-2020 STEM Scale-Up Program

**Grade Levels**: Kindergarten-5, available in school or out of school

**Website:** https://newbo.co/code-org-partnership/
**Video Link:** https://youtu.be/rNIM1fzJ8u0

**Award Provides:**
- Curriculum by Code.org.
- Connections with other Iowa computer science teachers through in-state support network.
- Ongoing support during implementation from NewBoCo staff, facilitators, and online forums.
- Lunch during the workshop.

**Additional Cost(s) to Awardee In 2019-2020:**
- None

**Approximate Sustainability Cost After Award Period:**
- The curriculum is free forever. Estimated classroom supply costs are $25-$50 per class, with many supplies that can be reused year after year.

**Program Summary:**
Code.org's six Computer Science Fundamentals courses are designed to be flexible for your K-5 classroom. How you implement is up to you - teach CS Fundamentals for your next science unit, use it to support math concepts, add technology time to your schedule once a week, or go deeper with extension activities and projects!

NewBoCo's 1-day CS Fundamentals Intro Workshop provides support for teachers, requiring no prior computer science experience to get started. The curriculum and workshop are also designed to foster equity and diversity in the classroom, breaking down barriers and stereotypes around computer science.

Code.org's curriculum was created with the 2017 Computer Science Teachers Association (CSTA) standards in mind, but also includes opportunities to support national Math, English Language Arts, and Science standards. In fact, a recent research study (http://bit.ly/CSAchieve) found that classrooms with resourceful teachers see higher scores on English, math, and science standardized tests after teaching these lessons. In addition, the curriculum is available online at no cost for anyone, anywhere to teach. For more information about Code.org's goals and approach to their courses, please visit their website for curriculum values and professional learning values.

**Requirements to Implement the Program:**
**Educator(s) must register for one of the Iowa workshops offered throughout the state.** STEM Region Managers will have registration links for workshops in each STEM region.

**Professional Development:**
Several 1-day workshops will be held throughout the 2019-20 year. Workshops require a minimum of 12 registrations to be held. If a workshop is cancelled due to low registration, you may register for another workshop. Workshops will be offered during the summer in all six STEM regions, and additional public workshops will be available throughout the school year.

**Duration:** 1 day
**Date(s):** Multiple options will be offered in July and August. STEM Region Managers will have registration links for workshops in each STEM region.

**Locations:** Multiple options will be offered in July and August. STEM Region Managers will have registration links for workshops in each STEM region.

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## Computer Science Principles
2019-2020 STEM Scale-Up Program

**Grade Levels**: 9-12, available in school

**Website:** https://newbo.co/code-org-partnership/
**Video Link:** https://youtu.be/jQm0z894CG0

## Award Provides:
- Curriculum by Code.org, recognized by the College Board as an endorsed provider.
- Connections with other Iowa computer science teachers through in-state support network.
- Opportunity to earn licensure renewal or graduate credit through Keystone AEA.
- Ongoing support during implementation from NewBoCo staff, facilitators, and online forums.
- Travel stipend of $50 per workshop day.
- Per diem stipend of $60 per workshop day for teachers' time.
- $100 to cover classroom supplies.

## Additional Cost(s) to Awardee In 2019-2020:
- None

## Approximate Sustainability Cost After Award Period:
- The curriculum is free forever. Estimated classroom supply costs are $100 per class, with some supplies that can be reused year after year.

### Program Summary:
Computer Science Principles introduces students to the foundational concepts of computer science and challenges them to explore how computing and technology can impact the world. More than a traditional introduction to programming, it is a rigorous, engaging and approachable course that explores many of the foundational ideas of computing so all students understand how these concepts are transforming the world we live in.

Our year-long Professional Learning Program provides ongoing support for teachers, requiring no prior computer science experience to get started. The curriculum and workshops are also designed to foster equity and diversity in the classroom, breaking down barriers and stereotypes around computer science.

This year-long course can be taught as an AP or non-AP course—no prerequisites required for students or for teachers new to computer science! Students will explore topics like the Internet and how it works; how and why digital information is encoded, represented and manipulated; privacy; and programming. In addition, the curriculum is available online at no cost for anyone, anywhere to teach. For more information about Code.org's goals and approach to their courses, please visit their website for curriculum values and professional learning values.

### Requirements to Implement the Program:
**Educator(s) must participate in all nine workshop days throughout the year and submit a Code.org application at** https://newbo.co/code-org-partnership/#apply**.**

**A memorandum of understanding signed by the building administrator is required before training or materials can be delivered.**

### Professional Development:
A five-day summer workshop will be held July 15-19. Location is yet to be finalized. Four, one-day Saturday workshops will be held during the academic year.

**Duration:** 1 week, plus four 1-day Saturday workshops
**Date(s):** July 15-19, 2019
**Location:** Final location TBD, with an alternative academic year location available in Dubuque.

### Information Session:
To learn more about this program and have questions answered, please join a virtual information session on Thursday, January 31st at 7:30am via Zoom. You may join via your computer at https://zoom.us/j/367460226 or call in from your phone at +1 646 558 8656 with the meeting ID: 367 460 226. Contact your STEM Region manager for a link to the recording if you are unable to attend.

**STEM Scale-Up Program Application Link:** www.IowaSTEM.gov/Scale-Up-Application

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# Engineer Your World
## 2019-2020 STEM Scale-Up Program

**Grade Levels**: 9-12, available in-school

**Online Information Sessions:** To attend a session on 1/29 (3:30-4:30pm), 2/6 (12-1pm), or 2/15 (7-8am) – or to request a session that works for your schedule – visit www.engineeryourworld.org/learn-more/
**Website:** www.engineeryourworld.org and www.engineeryourworld.org/iowa/
**Video Link:** http://engineeryourworld.org/students/ (scroll to bottom of page)

## Award Provides:

- One-year license for *EYW I: Engineering Design and Analysis* curriculum, including lesson plans, teaching materials, samples and assessments
- Fee waiver for one educator to attend a two-week professional development institute (PDI) in Iowa City with lodging, parking, breakfast and lunch for 10 days.
- Equipment kit for a class of 24 students
- Year-round access to *EYW* instructional support specialists at UT Austin and the University of Iowa; membership in an online professional learning community of 300+ educators
- Webinars and in-person professional development opportunities throughout the year

**Additional Cost(s) to Awardee In 2019-2020:**
- Travel and dinner expenses for the two-week PDI in Iowa City

**Approximate Sustainability Cost After Award Period:**
- Annual licensing fee of $1500 (if 9-12 school enrollment <200) or $3000 (if 9-12 >= 200) per year for two years
- Roughly $16 per student per year for consumables

## Program Summary:

*Engineer Your World* (*EYW*) at The University of Texas (UT Austin) is proud to partner with The University of Iowa to bring Iowa high schools an innovative engineering program founded on the belief that all students can benefit from learning to solve problems like an engineer, regardless of their career aspirations. Our innovative, student-centered curriculum engages learners in collaborative, student-directed projects that build creative problem-solving and engineering design skills; teach the value of collaborating to solve complex, modern problems; and create a strong foundation for future STEM learning.

**What Do Students Do?** Students in *EYW I: Engineering Design and Analysis* design an easy-to-use pinhole camera for artists with disabilities, redesign a hand-powered flashlight to improve product performance and gain market share, design an experiment to brew the perfect cup of coffee, collect and analyze data to design a safer building, program electronic music, and create an automated aerial imaging system. To request a detailed course description and access to a sample lesson, visit www.engineeryourworld.org/learn-more/

**Dual-Enrollment Option** Students interested in earning college credit for their work in *EYW I* may apply to dual-enroll at UT Austin, home to *EYW* and a nationally top-ranked engineering program. Dual-enrolled students gain valuable insight into college-level performance expectations as they complete additional online assignments to demonstrate a deeper understanding of course concepts. See www.engineeryourworld.org/courses/dual-enrollment/

**Who Should Take *EYW I*?** EYW I is for all students, regardless of whether they are interested in becoming an engineer. Students who plan to pursue future engineering studies benefit from learning rigorous design skills and habits of mind and from exploring multiple engineering fields and professions. Those with other plans benefit from learning to think critically and solve complex problems – a skill that is useful in any field. *EYW I* is appropriate for students in grades 9-12 who have completed Algebra I.

**Who Should Teach *EYW I*?** We work with teachers from all backgrounds to ensure that they are successful in the *EYW* classroom. Learn about characteristics of successful *EYW* teachers and explore our professional development and ongoing support programs at www.engineeryourworld.org/teachers/

**How Will *EYW I* Fit Into a School's STEM Pathway?** *EYW* can work as a foundational design course or a capstone to a STEM sequence. See how different schools are using our courses at www.engineeryourworld.org/courses/stem-pathways.

**Standards Alignment:** *EYW I* is aligned with multiple sets of national (e.g., NGSS) and state standards. In Iowa, it addresses standards in STEM, reading, writing, social studies, and employability. Visit www.engineeryourworld.org/iowa to see state standards alignment.

## Requirements to Implement the Program:
Educator(s) must attend a two-week professional development institute. **Before training or materials can be delivered, school must execute a three-year services agreement with UT Austin.** Schools needing to offer the course less frequently than annually can extend the term of their services agreement accordingly.

## Professional Development:
**Duration:** Two weeks
**Date(s):** July 8-19, 2019
**Location:** The University of Iowa, Iowa City

**STEM Scale-Up Program Application Link:** www.IowaSTEM.gov/Scale-Up-Application

# Light & Shadow
2019-2020 STEM Scale-Up Program

**Grade Levels**: PreK-2, available in school and out of school

**Website:** https://regentsctr.uni.edu/

**Award Provides:**
- A kit that includes a large floor screen and small table screen, a variety of light sources (LED work lights, Maglites, light boards, etc.) a variety of materials (translucent, opaque, and transparent) to interact with light and shadow
- Wooden storage cart for Light & Shadow materials
- Print resources for learning about the science of light and shadow, and how to set up a light and shadow center in a classroom or informal setting
- **High quality professional learning taught by degreed early childhood master teachers with classroom experience**
- One UNI graduate or undergraduate credit (based on educator's needs)
- Educator stipend/sub-pay ($120 per day) to attend professional development (must attend **both** days to get stipend)

**Testimonial from Past Scale Up Participant:**
*"Your professional learning changed my approach to teaching. I notice it in the observations I make, and in the questions I ask. I notice it in my conscious decisions not to help them too much, fix it for them, or tell them the answer. It has been a wonderful experience for me professional and for our students!"*

**Program Summary**
Technology has been defined by the National Academy of Engineering as "any modification of the natural world done to fulfill human needs or desires." In Light & Shadow (L&S), students construct the technology of shadows to make an object interact with light in an interesting way. Through construction, they **engage in the processes of engineering design** and **grapple with the constraints of physics** to cast different kinds of light and/or develop shadows using a variety of objects, screens and light sources. In the act of shadow construction, students **engage in the mathematics of spatial thinking, geometry and measurement.** Students **collect and compare data**, providing a meaningful context to address **Iowa Core Literacy Standards of Language, Speaking and Listening, and Writing**. Students participate in conversations about object properties, light and design. They recount their construction experiences with appropriate facts and relevant descriptive details. They encounter unknown and multiple-meanings of words and phrases as they seek to explain and **engage in scientific argumentation**. Students develop **21st Century Skills such as creativity and innovation** when they create new and worthwhile ideas to explore light to create shadows. **Civic Literacy** is experienced as they co-create rules and management systems for working within L&S investigations. Students are nurtured in **Life and Career Skills** as they work independently to pursue a design goal, and interact with others to problem solve. Rather than learning *about* productivity and accountability, students are immersed in an atmosphere where *these traits are practiced and developed.* As a result, L&S is a fully integrative STEM activity that meets many **Iowa Early Learning Standards** and **Next Generation Science and Engineering Standards.**

**Requirements to Implement the Program:**
Educator(s) must attend 2 six-hour days of professional development (one before the school year where educator receives materials, one after implementation begins) and a minimum of 3 hours of online interaction. A memorandum of understanding signed by the building administrator is required before training or materials can be delivered.

**Professional Development:**
Research shows preschool and primary grade teachers are uncomfortable teaching science content, particularly physical science content. **L&S professional learning is structured to allow teachers to explore the same materials that will be provided to their students.** Like their students, they are encouraged to explore features of light and shadows. In the process of manipulating light and shadow, concepts in physics are revealed or revisited. **Teachers learn to view technology as more than computers or electronic devices, and begin to value students' creative endeavors to explore shadows as opportunities to nurture the next great inventor.** L&S professional learning introduces engineering's simple definition of "design under constraint." This encourages teachers to re-envision (re-engineer) their physical classroom, routines and time schedules under state and district constraints to optimize their students' learning. **As a result, standards in engineering and physical science become more relevant and authentic in their work with students and teachers discern many opportunities for addressing literacy, math and 21st Century skills.** L&S professional learning assists teachers in documenting children's growth in inquiry and engineering practices. Throughout the fall semester, teachers will have the opportunity to engage in online professional learning communities, sharing photos, video, experiences and successes.
**Duration:** 2 six-hour days plus communicating with peers and instructor through social media
**Date(s):** First date on weekday in summer, second date on a Saturday after school begins
**Location:** In your STEM Hub area at a place to be determined

**STEM Scale-Up Program Application Link:** www.IowaSTEM.gov/Scale-Up-Application

# GREATNESS STEMS FROM IOWANS
### GOVERNOR'S STEM ADVISORY COUNCIL

## Making STEM Connections
### 2019-2020 STEM Scale-Up Program

**Grade Levels**: K-8, available in or or out of school

**Information Session:** 4 PM, 2/12, https://uni.zoom.us/j/657311591
**Website:** http://www.sciowa.org/makingstemconnections
**Video Link:** https://www.youtube.com/watch?v=sRLWF332Dpg

**Award Provides:**
- Full day of Professional Development

- Program guide including lesson prompts, teacher resources, and books for teacher instruction and inspiration

- Maker toolbox with materials to activate youth experiences including a variety of materials for a classroom of 30

- Non-fiction and fiction literature for student engagement and understanding

- Educator stipend/sub-pay available ($120) to attend professional development

- Travel stipend available ($50) to attend professional development

**Additional Cost(s) to Awardee In 2019-2020:**
- Opportunity for teacher license credit

**Approximate Sustainability Cost After Award Period:**
- Annual consumable replacement does not exceed $200 & is dependent on the use of materials

**Program Summary:**
*Making STEM Connections* is designed to empower teachers to cultivate engaging, purposeful and successful extensions of their already developed curriculum. The making philosophy directs students to use their hands in conjunction with their minds to produce meaningful learning outcomes. Educating teachers on the process of making as well as familiarizing them with the tools and materials to be used will be the cornerstone of the *Making STEM Connections* professional development. A classroom using the *Making STEM Connections* kit might have students learning how to fuse plastics to create textiles or assembling an art-bot using a DC motor and batteries. Teachers are provided with a curricular framework to develop STEM principles and enhance those already existing in their classroom using maker materials, both high tech and low tech, as well as skills.

This curriculum framework is focused around the idea that making and tinkering are ways to engage student's minds and build conceptual understanding around academic content. *Making STEM Connections* is structurally supported by cross-curricular experiences and opportunities, including literacy and math, to reinforce the maker foundation of active learning and problem solving.

The purpose of making as a learning technique is summed up by Dale Dougherty, Chairman of Maker Education Initiative, "It is the difference between a child who is directed to perform a task and one who is self-directed to figure out what to do."

**Requirements to Implement the Program:**
**Educator(s) must participate in a full day of professional development. A memorandum of understanding signed by the building administrator is required before training or materials can be delivered.**

**Professional Development:**
Includes an overview of making, strategies for inspiring the maker mentality, training for tool use and safety as well as a walkthrough of each lesson prompt. Educators will also benefit from four regional webinars offered as continued support and education about making and use of their kits.

**Duration:** 1 day
**Date(s):** Multiple options in each region will be offered July-September 2019
**Location:** Trainings are held in each of the six STEM regions

**STEM Scale-Up Program Application Link:** www.IowaSTEM.gov/Scale-Up-Application

# Pint Size Science
## 2019-2020 STEM Scale-Up Program

**Grade Levels**: PreK-2, available in or out of school

**Information Session:** 4 PM, 2/6, https://uni.zoom.us/j/746193422
**Website:** www.sciowa.org/scaleup
**Video Link:** https://www.youtube.com/watch?v=QP_sOIH8nMY&t=5s

**Award Provides:**
- Full day of Professional Development
- Program guide including lesson prompts, teacher resources and books for teacher instruction
- A kit of four curriculum modules with lesson plans and classroom materials for implementation
- Additional resources, including a variety of videos and assessments accessible through the PSS website
- Multiple webinar sessions offered for ongoing professional development and collaboration amongst implementers
- Educator stipend/sub-pay ($120) to attend professional development
- Travel stipend ($50) to attend professional development

**Additional Cost(s) to Awardee In 2019-2020:**
- Opportunity for teacher license or CEU's

**Approximate Sustainability Cost After Award Period:**
- Replacements of consumables are not to exceed $50

**Program Summary:**
Pint Size Science introduces children to STEM topics through discovery learning. Using a hands-on approach that engages and inspires young minds to explore scientific phenomena, the program works to not only build science understanding but also respond to the ever-changing interests and abilities of children. Pint Size Science includes a literacy component that pulls together the most important ideas of the STEM topic being discussed. Fundamental mathematical skills are also reinforced through activities, including counting, numbering, and graphing.

The Pint Size Science kit includes four modules of lesson prompts, materials for investigation and children's literature. The foundation of the program is the introduction module titled, "Science Sprouts". This provides an introduction to the STEM fields and scientific investigation. Recognizing the need to be flexible to existing school curriculum materials and needs of organizations, schools and students, Pint Size Science allows educators to pick the remaining three modules to complete their set of instructional materials. Implementers chose one module from each of the following groups:

| Group 1 | Group 2 | Group3 |
|---|---|---|
| **Bits and Bots** will provide an introduction for students in learning programming and coding | **Classifying Creatures** develops math skills in sorting and classifying as children observe and compare features of various animals and insects | **Exploring Engineering** continues children's natural curiosity in to how things work |
| **Colorful Chemistry** introduces young learners to the three phases of matter found on earth; solids, liquids and gases | **Mini Meteorologist** inspires students to measure and understand the weather happening around us | **Push and Pull** investigates the forces that cause motion |
| **Tiny Tinkerers** brings the Maker Movement to the early childhood learning environment | **Homes and Habitats** challenges students to think about where different animals live based on their environments | **Fascinating Farmers** brings the world of agriculture to young children |

**Requirements to Implement the Program:**
**Educator(s) must attend a full day of professional development. A memorandum of understanding signed by the building administrator is required before training or materials can be delivered.**

**Professional Development:**
Training to create deeper connections and instructional techniques to implement a STEM rich environment with a focus on inquiry, project-based learning, questioning and evaluation of student learning. Training includes a walk-through of each classroom curriculum module.

**Duration:** 1 day
**Date(s):** Multiple options in each region will be offered July-September 2019
**Location:** Trainings are held in each of the six STEM regions

**STEM Scale-Up Program Application Link:** www.IowaSTEM.gov/Scale-Up-Application

# GREATNESS STEMS FROM IOWANS

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## STEM in Action®
### 2019-2020 STEM Scale-Up Program

**Grade Levels**: PreK-5, available in school and out of school

**Website:** http://www.hand2mind.com/STEMinAction
**Video Link:** https://www.youtube.com/watch?v=zEGLYNXZ03k&feature=youtu.be
**Correlations Link:** http://bit.ly/CorrelationsSummary

## Award Provides:
- 3 STEM in Action® modules
- Plus an additional Helicopter Hang Time Exploration-Introductory Module and one Engineering Design Process Flip Chart

## Each Module Includes:
- 1 Teacher's Guide
- 6 reusable Student Activity Books
- Non-consumable and consumable materials for all activities in the module (6 sets of everything for up to 30 students)
- Editable and reproducible materials for Student Recording, Family Connection letter, STEM Teamwork Principles, STEM Prompts poster, Engineering Steps poster
- Facilitating STEM in the Classroom video
- Teacher help/set-up video, 1 per module

## Additional Cost(s) to Awardee In 2019-2020:
- Travel to and from the regional professional development trainings

## Approximate Sustainability Cost After Award Period:
- Replenishment of consumable items, refill kits (3 additional uses/module) cost between $0-$215 with a median price of $81 per kit

## Program Summary:
STEM in Action® modules follow the Engineering Design Process of defining the problem, planning solutions, making a prototype, testing the prototype, reflecting, communicating results and redesigning. These modules Integrate NGSS PRACTICES and Iowa Core MATH & ELA Curriculum while incorporating three-dimensional learning with an emphasis on engineering as well as AUTHENTIC hands-on, problem-based learning.

Every module developed in conjunction with Purdue University or Texas A & M is tested in classrooms to ensure the lessons are teacher friendly, and the activities are fun and engaging for students.

These modules:
- introduce students to the Engineering Design Process
- seamlessly integrate science, technology, engineering, mathematics, and literacy
- teach students how to work in collaborative teams to solve real-world problems

Students conduct investigations, analyze data to make evidence-based prototypes/models as possible solutions, test, make claims, communicate their findings to other teams and redesign. Math is embedded in the problems as measurement, budgeting, geometry, numeracy, fractions, data collection, etc.

There are 5–8 hands-on lessons per module. For grades K–2 each lesson takes no more than 30 min., and for grades 3–5 a lesson is 20–60 min. long. One module takes about 2–3 weeks to complete.

These lessons: require little prep time; provide flexibility for use in centers, classrooms, STEM labs, STEM camps, afterschool programs and summer school; and connect "real world" and school work through engaging activities. Each module strikes the perfect balance of rigor and ease of use.

## Requirements to Implement the Program:
Educator(s) choose 3 of the 25 modules and attend a half-day of professional development. There is no digital requirement. A memorandum of understanding signed by the building administrator is required before materials can be delivered.

## Professional Development:
Training includes an overview of the organization of the program, STEM teaching best practices, and a breakout session with time to explore (hands-on by grade level) your 3 modules and confirm which you will implement before you place the final order. 5 follow-up webinars to network and ask questions during the school year are also included.

**Duration:** 1 half-day of training
**Date(s):** Training dates will be offered in the summer, Tuesday-Friday, July 9-August 2, 2019
**Location:** Trainings are held in each of the six STEM regions

**STEM Scale-Up Program Application Link:** www.IowaSTEM.gov/Scale-Up-Application

# GREATNESS STEMS FROM IOWANS
GOVERNOR'S STEM ADVISORY COUNCIL
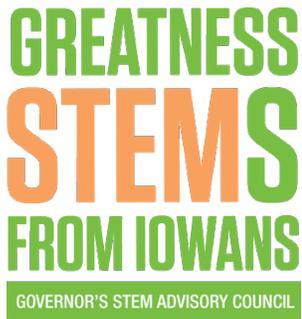
## STEM Innovator®
### 2019-2020 STEM Scale-Up Program

**Grade Levels**: 6-12, available in school or out of school

**Information Sessions:** 4:00pm 1/28, 2/8, 2/21
https://uiowa.zoom.us/j/607393418
**Website:** www.steminnovator.org
**Video Link:** https://youtu.be/n_wrImqRS0o

## Award Provides:
- Online and onsite STEM Innovator® Institute
- Access to STEM Innovator® Curriculum Toolkit and Portfolio Assessment designed by STEM industry experts and the University of Iowa
- Hotel, parking, breakfast and lunch during onsite Institute
- An in-state network of professionals who share strategies across schools and leverage local, state and national partners
- STEM Innovator® certification
- STEMinars with national experts for educators and students
- Offer college credit to high school students
- Educator stipend of $975 upon completion

## Additional Cost(s) to Awardee In 2019-2020:
- Transportation to The University of Iowa, July 15-19
- Optional: Earn up to 5 graduate credits from the University of Iowa At $149/credit

## Approximate Sustainability Cost After Award Period:
- STEM Innovator® Toolkit and Portfolio Assessment Licensing Fee $300 per teacher

## Program Summary:
STEM Innovator® professional development empowers educators to design a unique innovation model for their school and district. Educators transform classrooms into incubator spaces where student teams solve real-world problems alongside industry mentors. Students demonstrate future-ready competencies through prototype development while employing the practices of science, engineering, innovation and entrepreneurship. Educators design an in-school or out of school model to meet their district's STEM education needs. The process prepares students with the skills and mindset to persist in STEM education, pursue STEM careers, and become innovators of the future.

Teachers emerge from STEM Innovator® with the capacity to implement the same tools, knowledge, and management strategies used in STEM industry, start-up, college, and university settings. These include Lean Start-up, Design Thinking, Agile, Canvasing, SCRUM, STEM practices, Maker, rapid prototyping, data-driven decision making and collaborative teaming. These innovation strategies provide students opportunities to experience and demonstrate adaptability, failing, resilience, effective communication, teamwork, critical thinking, and creativity- all skills critical for careers of the future, and become the innovators of the future.

STEM Innovator® educators have provided over 62,782 secondary students with the opportunity to engage in the innovation, invention and entrepreneurship process by leveraging partnerships with local and national mentors. High school students who submit a STEM Innovator® Portfolio demonstrating industry and college STEM innovation competencies may qualify for college credit. STEM Innovator® is research driven and provides evidence of impact on students to educators and community partners. A large, multi-year longitudinal research study indicates significant growth in 21st Century Skills (Collaboration, Creativity, Critical Thinking, Communication), Innovation and Entrepreneurial Skills and Mindsets (Resilience, Adaptability, Leadership, Teamwork, Grit, Decision Making), and NGSS Science and Engineering Practices. Significant growth persists when data is disaggregated by gender, racial classification, and school demographics. The STEM Innovator® platform assists in closing the achievement gap traditionally found in STEM education. The result is a more diverse pool of students who demonstrate and self-identify as having college and career competencies necessary to persist in STEM education and career fields.

## Requirements to Implement the Program:
Educator(s) must participate in all onsite and online sessions. Teams of two or more educators from multiple disciplines receive priority registration.

## Professional Development:
A five-day onsite STEM Innovator® Institute, 10 online sessions

**Duration:** 1 week on site; 1 week equivalent online
**Date(s):** July 15-19, 2019 on site; Online July 1-December 15, 2019
**Location:** University of Iowa onsite; Online from home institution

**STEM Scale-Up Program Application Link:** www.IowaSTEM.gov/Scale-Up-Application