STEM Scale-Up Program

Menu for 2024-2025

TOMORROW STEMS FROM IOWA

GOVERNOR'S STEM ADVISORY COUNCIL

Scan the QR Code for electronic versions of the Fact Sheets and access to hyperlinks.

2024-2025 STEM Scale-Up Program Menu

Description: Watch your children become more curious and engaged as they actively explore the role of balance within the world of objects, and with their own bodies.
Grade Level: PK-2
Contact: Beth VanMeeteren, University of Northern Iowa, Iowa Regents' Center for Early Developmental Education Beth.VanMeeteren@uni.edu
Website: https://regentsctr.uni.edu

Description: AI for K-12 Educators is a professional development series that provides educators with a high-level understanding of how Artificial Intelligence (AI) and Machine Learning (ML) impact our society.
Grade Level: K-12
Contact: Samantha Dahlby, NewBoCo, samantha@newbo.co
Website: https://newbo.co/education/educators/ai-professional-development/

Description: A collection of online curricula that teaches math or science through the lens of coding. Students write real, text-based programs which bring to life the core concepts they are learning.
Grade Level: 6-12
Contact: Ness Blackbird, Blackbird Code, ness@blackbird.com
Website: https://blackbirdcode.com

Description: Platform maximizes the impact of your current math curriculum and increases student engagement in math.
Grade Level: 6-12
Contact: Doug Sovde, Derivita, doug.sovde@derivita.com
Website: https://www.derivita.com/getting-started-onboarding

Description: Exploring and Connecting to Iowa's Agriculture is a two-day professional development workshop that engages educators with ag professionals and classroom curriculum.
Grade Level: 2-8
Contact: Cathryn Carney, Iowa Agriculture Literacy Foundation, ccarney@iowaagliteracy.org
Website: https://www.iowaagliteracy.org/

Description: FUSE creates onramps to deeper STEAM engagement and encourages STEAM exploration through an innovative, challenge-based approach and studio-like environment.
Grade Level: 4-12
Contact: Reed Stevens, Northwestern University, reed-stevens@northwestern.edu
Website: https://www.fusestudio.net/

Description: A program designed to captivate young minds while demystifying real-world phenomena.
Grade Level: K-5
Contact: Valerie Cole, hand2mind, Inc., vcole@hand2mind.com
Website: https://www.hand2mind.com/iowascaleup

Description: This lesson design framework focuses around the idea that making and tinkering are ways to engage student's minds and build conceptual understanding around academic content.
Grade Level: PK-8
Contact: Robert Burnett, Science Center of Iowa, rob.burnett@sciowa.org
Website: https://www.sciowa.org/education/professional-development/educators/making-stem-connections/

Description: An engaging, online lesson and problem bank. The site was designed to be accessible to students on any level from basic to AP.
Grade Level: 6-12
Contact: Jack Replinger, Positive Physics, jack@positivephysics.org
Website: www.positivephysics.org/

Description: Offers easy-to-use building blocks and a series of age-appropriate coding apps that develop computational thinking skills and spark a curiosity for STEAM in young learners.
Grade Level: K-5
Contact: Jamie Guidry, Robo Wunderkind, Inc., jamie@robowunderkind.com
Website: https://www.robowunderkind.com/us/home

Description: A tool to teach freehand sketching and improve students' spatial skills.
Grade Level: 6-12
Contact: Lelli Van Den Einde, eGrove Education, Inc., lelli@egrove.education
Website: https://egrove.education/

Description: Incorporate age-appropriate STEM+C concepts into children's programming. Children collaboratively explain phenomena or solve the problem, thereby making sense of the STEM concept.
Grade Level: PreK-2
Contact: Gabriela Rose, Allegheny Intermediate Unit Math & Science Collaborative, gabriela.rose@aiu3.net
Website: Storytimestem.com

Description: Enhances K-5 core math curricula by building students' conceptual understanding, fluency, and problem-solving skills across addition, subtraction, place value/base ten, multiplication, fractions, and measurement/data.
Grade Level: K-5
Contact: Rachael Labrecque, Teachley, LLC, rachael@teachley.com
Website: https://www.teachley.com/

Description: A revolutionary STEM game that teaches how computers work at a fundamental level. Students build marble-powered, mechanical computers to solve a series of structured logic puzzles using their own hands instead of a screen.
Grade Level: 3-12
Contact: Anna Riechers, Upper Story, anna.riechers@upperstory.com
Website: https://upperstory.com/

All About Balance

GRADE LEVELS:
PreK-2

Educational Setting:
Both in school and out of school.

Award Provides:
A classroom kit which includes:
- steppingstones
- rocker board
- yoga balance poses for young children
- tinker toys to investigate building stable and kinetic structures
- left / right balance board
- double set of wooden mini unit blocks
- suspended left/right balance scale
- suspended 360° balance board
- variety of tops (tippe, teetotum, swirler, plunger, spring launched)
- optical illusion tops
- materials for children to build simple wooden tops
- access to a Google Drive with ideas and suggestions on how to introduce, implement, and assess balance experiences and integrate literacy
- mobile stand with arms and objects to hang

Professional Learning:
Led by early childhood experts with classroom experience, includes:

All About Balance teaches children to become more curious and engaged as they actively explore the role of balance within the world of objects and with their own bodies. Balance is essential to human movement, the design and engineering of technology, and the aesthetic elements of art.

All About Balance highlights STEM and literacy by immersing students in doing STEM every day. These hands-on experiences create a desire within children to master the tools of reading, writing, and mathematics, helping them communicate more effectively about science learning. PK-3 educators implementing this program report the integrative approach has brought joy in teaching and learning.
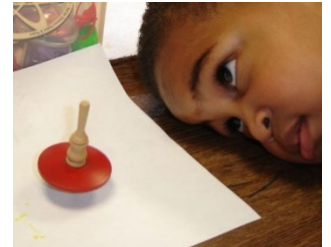
For STEM to be meaningful to young learners, four tenets must be in place:
1) children must be able to **produce** an action by themselves,
2) the result of their action must be **immediate,**
3) the result of their action must be **observable,**
4) and there must be something for children to **vary**.

All About Balance fits these measures well. For example, children can **produce** the action of positioning objects with the **immediate** result of that action, **observe** the state of balance, and then **vary** spatial positions until the objects reach a state of balance or stability.

Each kit contains special materials that were co-developed and manufactured through a partnership with UNI's Dept. of Applied Engineering and Technical Management. In the development of our moveable fulcrum activity, one

experienced urban construction manager exclaimed, "That's how construction cranes really work!"

These materials are open-ended, and, while designed for PK-3 children, they will attract and engage older children and adults.

All About Balance materials break down for easy storage and do not require a large section of classroom space when in use. Body balance experiences will also prove helpful for indoor recess.

- ongoing support through a private social media platform.
- one UNI graduate or undergraduate credit (based on educator's needs) that also serves as a License Renewal Credit for degreed educators.
- $240 participant payment when educators attend both face-to-face sessions.

Additional Cost(s) to Awardee in 2024-2025:
None

Approximate Sustainability Cost After Award Period:
Materials will last for years with typical classroom use.

Website:
Regentsctr.uni.edu

Videos:
All About Balance

Social Media Facebook:
Regents' Center for Early Developmental Education
Instagram:
ia_regents_center

Informational Webinar(s):

- Friday Jan 12 @ 3:45
- Thurs Jan 18 @ 3:45
- Friday Jan 19 @ 3:45
- Thurs Jan 25 @ 3:45
- Friday Jan 26 @ 3:45

Link to attend

Requirements to Implement the Program:

1. Educator(s) will attend two six-hour days of highly interactive professional development. One before the start of the school year when the educator receives the classroom kit. One in the fall after implementation begins.
2. Educator(s) receive a minimum of 3 hours of online interaction with peers and the instructor throughout the fall semester.
3. Upon attending both sessions of professional learning, educators will receive $240 participant payment.
4. In spring, educator(s) participate in the Iowa STEM Educator Survey.

Iowa Standards Alignment:

Balance experiences are applicable to many of the **Iowa Early Learning Standards** and **K-2 Next Generation Science Standards**.

- Constructing both stable and kinetic structures are contexts for rich and meaningful engagement in **engineering design**.
- In the act of construction, students engage in the **mathematics** of spatial thinking, geometry, measurement, and collecting and analyzing data.

The program addresses Iowa's **Literacy Standards of Language, Speaking and Listening, and Writing**, as children participate in conversations about balance and stability.

- They recount their construction experiences with appropriate **facts** and relevant descriptive **details**.
- They encounter new **vocabulary** and multiple meanings of words as they seek to explain and engage in scientific **argumentation**.

In addition, research shows that work on balance skills helps children to develop better **language** skills, improve **reading** and **writing skills**, improve **concentration** and **body control**, and positively impact **fine motor skills.**

Professional Development:

Session One: (a weekday in July/August) At the end of the first session, each educator will leave with a classroom kit.

Social Media Platform: Educators will sign up to a private social media platform to post photos or videos, seek advice, or ask a question. Many teachers tell us this network is one of their favorite parts of the program.

Session Two: (a Saturday in October/November) Awardees investigate balance with materials but with an added focus on how to document learning and integrate STEM with literacy.

Location: In your STEM hub region—TBD.

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

Artificial Intelligence for K-12 Educators

GRADE LEVELS: K-12 **Educational Setting:** Both in school and out of school **Award Provides:** ● One 8-hr in-person PD (required) ● Three 2-hr synchronous virtual sessions ● Six 1-hr asynchronous virtual modules ● (Awardees must attend the initial in-person PD + at least 7 hours of virtual sessions to receive credit and stipend) ● Book: Machine Learning for Kids: A Project-Based Introduction to Artificial Intelligence ● Access to numerous online resources and lessons to teach about Artificial Intelligence and Machine Learning. **Additional Cost(s) to Awardee in 2024-2025:** ● None **Approximate Sustainability Cost After Award Period:** ● None	**2024-2025 STEM Scale-Up Program Summary:** NewBoCo's tech education programming focuses on giving Iowans access to education that supports STEM skills while fostering creativity and excitement for the subject. We've taken great strides in Iowa over the last 7 years to increase access to computer science education. Working with educators across Iowa, we noticed an additional need for professional development on Artificial Intelligence (AI) and Machine Learning (ML) technologies. As these technologies are entwined with our daily lives, they have become an essential part of computer science education. To address this, we collaborated with MindSpark Education and the University of Maryland to design a professional development series that provides educators with a high-level understanding of how AI and ML impact our society and tangible resources and activities they could use to support teaching these concepts in the classroom. K–12 participants will experience activities and modules around perception, natural interaction, and the societal impact of AI. They will create a lesson plan to share with the cohort and receive other lesson plans generated by their peers to help take what they learned back to their educational environments. Learning will happen during a 1-day, in-person workshop; virtual, asynchronous modules; and three virtual, synchronous sessions that culminate in the sharing of lesson plans. Participants can earn 1 teacher relicensure credit, 1 Continuing Education Unit (CEU), or 15 DHS Clock Hours. Join us on January 31st at 4pm for a virtual information session. Register here. **Requirements to Implement the Program:** 1.) Educator(s) must attend the initial 8-hour in-person professional development. 2.) Educator(s) must participate in the STEM Council Scale-Up Educator Survey.

Website:
https://newbo.co/education/educators/ai-professional-development/

Social Media:
● twitter.com/NewBoCo

Informational Webinar(s):

January 31st, 4pm
 Register here

Iowa Standards Alignment:
- K-2 and 3-5: Lessons support a developmentally appropriate understanding of artificial intelligence. Students learn how AI is not magic through lessons that provide real-world examples of how we collect and organize data. The lessons allow students to use standards: 21.K-2.TL.1, 21.K-2.TL.2, and CSTA 1B-NI-05.
- 6-8: Students develop models, test, and discuss unintended logistical/ethical consequences if they were to be used at a larger scale (e.g. if they created a way to test for damaged products on a manufacturing line, but the error rates caused accidental waste products because the model didn't account for a detail, what would the impacts be on a company?). This connects to the standard: 21.6-8.TL.5.
- 9-12: Students combine skills they learned in earlier grades to work in groups, develop models, analyze potential consequences, and implement an AI model. This project would align with standards: 21.9-12.TL.1 and 3B-AP-08. Their AI model can also include a game that uses an AI algorithm to play against a human opponent (3B-AP-09).

Professional Development:
Duration:
● One 8-hr in-person PD (required)
● Three 2-hr synchronous virtual sessions
● Six 1-hr asynchronous virtual sessions
● (Awardees must attend the initial in-person PD + at least 7 hours of virtual sessions to receive credit and stipend)
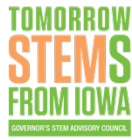
Date(s):
● In-person workshops will be scheduled during the weeks of July 29th and August 5th.
● Virtual learning sessions will be scheduled for late fall/winter 2024

Location:
● We plan to offer at least one in-person workshop in each STEM region pending demand.

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

GRADE LEVELS: 6-12	**2024-2025 STEM Scale-Up Program Summary:**

2024-2025 STEM Scale-Up Program Summary:

Blackbird teaches text-based coding to <u>all</u> students (and teachers!), starting in middle school. Project-based curricular units teaching math or science are included in core math and science classes. Accessible (but real) coding is used to illustrate core math / science concepts.

Text-based coding is normally taught in electives, so this important skill has been limited to students with the confidence to sign up for what might be a very challenging coding class.

The good news is that it doesn't have to be that difficult! Blackbird uses new educational technologies to make coding accessible enough for **all** students at the middle-school level and above. (Read more about the technology here, and evidence of success here.)

Blackbird's educational philosophy is based on **supported practice**. Closely scaffolded lessons gradually give way to less scaffolding and greater opportunities for creativity (particularly in longer curricula), but every student always has adequate support and the chance to review the material and get answers to their questions so they feel comfortable and can keep practicing successfully.

Instructors receive responsive, unlimited support from our knowledgeable staff.

Curricula include:

1. **Expressions and Equations:** 4-6 class periods at 6th grade math level. Also appropriate in 7th grade. *Students solve math problems and learn order of operations using code.*
2. **Ratios and Proportions:** 4-6 class periods at 7th grade math level. Can be used throughout middle school. *Students model ratios graphically using code.*
3. **Magnetism:** 9-10 class periods at 8th grade science level. It can also be used in high school. *Students build a simulation of a magnetic repulsion "rocket" that flies up and falls back down, using concepts of magnetism, acceleration and gravity.*
4. **Farmstead:** 9-10 class periods at 9th grade business (or math) level; can be used from eighth grade on. *Students model revenue and expenses of a small farming business over time using concepts of compound interest, reinvestment, profit and loss. Student code generates graphics illustrating the farm's growth over time with numerical readouts showing the farm's accounts.*
5. **Games and Animations:** One year (high school), multiple year (middle school). *Students write animations and games of increasing complexity, including guided projects with lighter scaffolding, and optionally creative projects.*

Requirements to Implement the Program:

1. One day training in person or 5 hours on Zoom. Additional Zoom practice times optional.
2. Each student will need a desktop or laptop computer.
3. Educator(s) must participate in the STEM Council Scale-Up Educator Survey.

Sidebar (left column):

GRADE LEVELS:
6-12

Educational Setting:
Both in school and out of school.

Award Provides:
- $140 stipend + $50 travel for training.
- Student licenses.

Additional Cost(s) to Awardee in 2024-2025:
None

Approximate Sustainability Cost After Award Period:
- $20 / student / year (access to all curricula)
- Training for new teachers: $150.

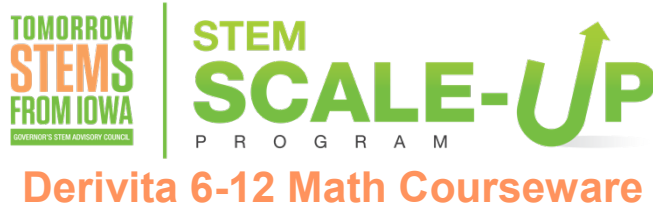|	

Website:
www.blackbirdcode.com
 	
Videos:
● Product video
● Ashley (teacher)
● Bailey (teacher)
 	
Slideshow:
Blackbird presentation
 	
Social Media:
● Facebook
 	
Informational Webinar(s):
Wednesday, Jan. 24 at 3pm
 	
Monday, Feb. 26 at 4pm
	Iowa Standards Alignment:
	
	Expressions and Equations: *Math:* 6. EE.A.2. A, 2.B, 2.C; CS 2-AP-11, 2-AP-13; *21 Century Skills*: 21.6-8.TL.1, TL.6, ES.2, ES.5.
	
	Ratios and Proportions: *Math:* 6. RP.A.3. B, 3.D, 7. RP.A.2.C; CS: 2-AP-11, 2-AP-13; *21 Century Skills:* 21.6-8.TL.1, TL.6, ES.1, ES.5.
	
	Magnet Rocket: *Science:* MS-PS3-2, MS-PS2-3; CS: 2-AP-11, 2-AP-13; *21 Century Skills:* 21.6-8.TL.1, TL.2, TL.3, TL.6, ES.1, ES.5.
	
	Farmstead: *Math:* 7. RP.A.1, A.2 (A, B, C), A.3, 7. NS.A.1 (A, B, C, D), 7. NS.A.3, 7. EE.A.2, B.3, B.4.
	CS: 2-AP-11, 2-AP-13.
	21 Century Skills: 21.6-8.ES.1, ES.2, ES.3, ES.4, ES.5, TL.1, TL.3, TL.4, TL.6, SS.7.18, 19, 28, 31.
	
	Games and Animations: *CS:* 2-AP-11, 12, 13, 14, 15, 16, 17, 18, 19
	Math Practices: MP1, MP2, MP4, MP5, MP6, MP7, MP8
	Math Content: 6.RP.A.1, 7.RP.A.1, 6.RP.A.2, 7.RP.A.2, 6.RP.A.3.D, 6.NS.A.1, 7.NS.A.1, 6.NS.C.6, 7.NS.A.2.A, 6.EE.A.2, 7.EE.B.4, 6.EE.B.5, 7.G.A.1, 7.G.B.4, 7.SP.C.6, 7.SP.C.8;
	Reading Standards for Literacy in Science and Technical Subjects: RST.6-8.3, 8.4, 8.7.
	21 Century Skills: 21.6-8.TL.1, TL.2, TL.4, TL.6, ES.1, ES.2, ES.4, ES.5
	
	Professional Development:
	Duration: 1 day in person or 5 hours at the Zoom. Additional Zoom supported practice times available.
	
	Date(s): In-person -- 7/13
	     Zoom -- 7/17
	     Will schedule more dates as needed.
	
	Location: TBD (In Iowa)
	
	Photos:
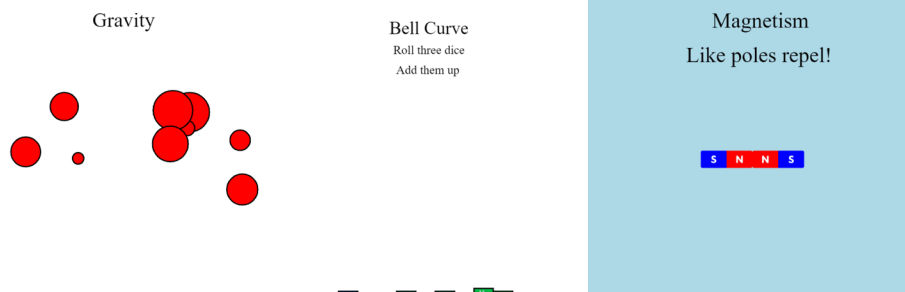
STEM Scale-Up Program Application Link: www.IowaSTEM.org/Scale-Up-Application

STEM SCALE-UP PROGRAM
Derivita 6-12 Math Courseware

GRADE LEVELS:
6-12

Educational Setting:
Both in school and/or out of school.

Award Provides:
- Full access to the Derivita platform for awarded teachers and their students
- One training session
- Additional trainings as needed

Additional Cost(s) to Awardee in 2024-2025:
- None

Approximate Sustainability Cost After Award Period:
- $16.50/student/year
- PD for additional cost

2024-2025 STEM Scale-Up Program Summary:

The Derivita platform maximizes the impact of your current math curriculum and increases student engagement in the following ways:

- Provides a high-quality **Math Item Bank** of 125,000+ items with immediate, personalized feedback and worked solutions covering concepts from **Grade 6 to Calculus III.**
- Provides opportunities for students to **identify** and **address their own misconceptions.**
- Offers the ability to quickly and easily **visualize student thinking.**
- Allows teachers to **track student progress** and **ensure concept mastery.**

Included with Derivita Student Licenses:

- **Seamless integration** with your school's LMS (e.g., Canvas, Schoology, or Google Classroom)
- **Direct alignment** to your existing math curriculum
- Full access to the Derivita Math Item Bank with **personalized feedback, fully worked solutions, and 10s-100s of randomizations per item**
- **Immediate, personalized feedback** to assist your students in mastering math concepts.
- Powerful authoring capabilities to **create your own math questions**
- **SpotCheck**, a formative assessment tool designed to increase student engagement and mathematical discourse
- **Automated grading options** and **grade passback** to your LMS's gradebook
- Classroom- and student-level **progress monitoring**
- **Ability to share** Derivita assignments and assessments with fellow teachers
- Browser **lockdown capabilities for assessments**
- Access to the in-house Derivita **Support Team** via email or phone
- Access to virtual PD opportunities and additional training sessions throughout the year

Requirements to Implement the Program:

Educator(s) must:
- Use a Canvas, Schoology, or Google Classroom LMS instance.
- Request and sign a Derivita software license agreement.
- Attend training.
- Participate in the STEM Council Scale-Up Educator Survey.

Student(s) must:
- Have access to a device (laptop, Chromebook, iPad, tablet, smartphone, etc.) and an internet connection.

Iowa Standards Alignment:

All tasks included in the Derivita Math Item Bank are aligned to the **Iowa Core Mathematics Standards**. Educators can easily search the Item Bank for a specific task by standard, topic, or keyword.

Professional Development:
In-Person and Virtual training sessions will be conducted.

Duration of In-Person Regional Trainings: 6 hours
Duration of Virtual Trainings: 4 hours

Date and Location *(specific dates and locations will be determined based on the number and locations of Scale-Up awards to Educators)*:
● In-Person: July 22 - August 9; Locations TBD
● Virtual: Dates and Times TBD

Both in-person and virtual training sessions will be made available within each STEM Region.

Photos:

Students and Teachers can access Derivita from **any** location, on **any** device - including mobile phones!

Use **SpotCheck** to deploy a single question to the entire class , auto-grade it, and review anonymized reslults in real time!

Use the **Show Work Feature** to visualize student thinking and compare their written work with their digital submissions!
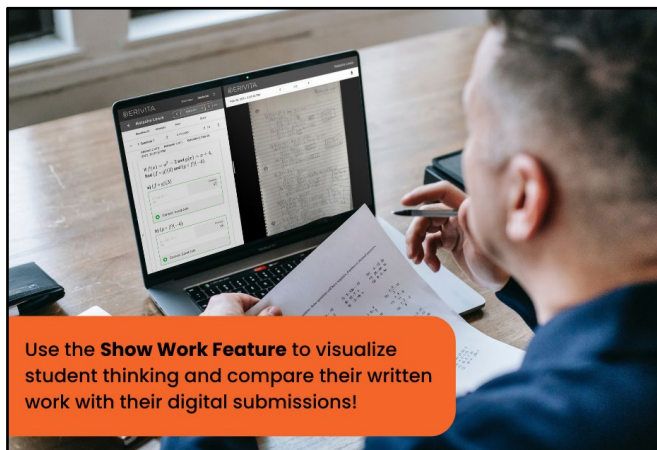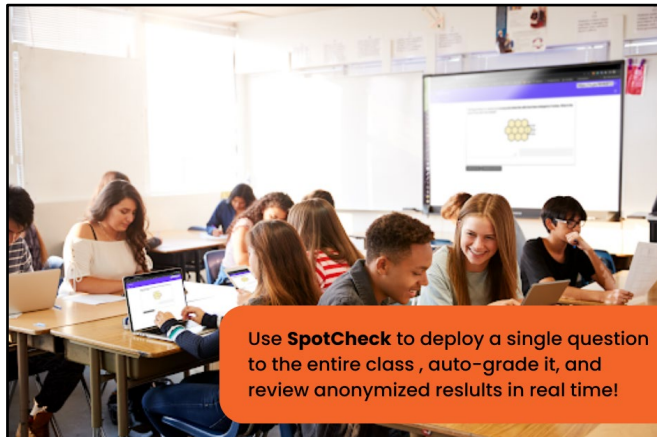
STEM Scale-Up Program Application Link: www.IowaSTEM.org/Scale-Up-Application
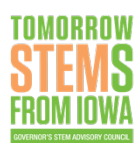
Exploring and connecting to Iowa's Agriculture:
Teacher Professional Development

GRADE LEVELS:
2-8
 	
Educational Setting:
Both in school and out of school.
 	
Award Provides:
● 2-day in-person professional development
● $290 stipend to support travel and workshop attendance.
● Materials for 25 youth
  a) Iowa Ag Today
  b) My Family Farm book series
  c) Bushel of Stories
  d) Career posters
● Links to lesson plans and electronic copies of the above
 	
Additional Cost(s) to Awardee in 2024-2025:
● None
 	
Approximate Sustainability Cost After Award Period:
● $0.50 shipping fee per Iowa Ag Today replacement pack.
● The hard copy materials are developed to be used over multiple years. If replacement is needed due to wear and tear, the Iowa Ag Literacy Foundation will replace hard copy materials at no cost.
	2024-2025 STEM Scale-Up Program Summary:
	The Iowa Agriculture Literacy Foundation (IALF) was established in 2014 with a goal to serve as a resource to increase the knowledge and awareness of agriculture (ag) and its importance among students. Early on, the IALF recognized that increasing student ag literacy began with the teacher; however, many educators lack a background in agriculture.
	
	IALF has developed a **two-day professional development workshop** that engages educators with ag professionals and classroom curriculum. The IALF advocates have observed that when teachers have materials, are trained in and become interested in agriculture, they see the value of using it to teach STEM. Ag can set context for learning about high-demand STEM careers.
	
	The curriculum encourages students to explore the science of food, fuel, and fiber. Students can see technology applied through drones, robotic dairies, and much more. Tractors are just one example of engineering principles applied in agriculture. Mathematics behind ag business, building design, or application rates show students the importance of applying those concepts.
	
	Each workshop will be two days and provides direct connection to the local host community, while following the same general format.
	  • The **first day** has tours to farms, agribusinesses, research centers, biorefineries, processing plants, cooperatives, grocery stores, and a variety of other locations that can help teachers understand the farm to fork story and see STEM applied.
	  • The **second day** of the workshop is spent in the classroom focusing on applying what educators saw and learned on the tours into integration plans that they can use in their classroom.
	The IALF takes a hands-on approach where teachers are actively seeing lesson plans demonstrated as they engage in facilitated inquiry-based learning.
	
	These workshops qualify for license renewal credit and/or graduate level credit. The IALF works with AEA PD Online to offer this through hybrid instruction – in person and online. Participants can earn credit through the AEA PD Online partners including Drake University, Morningside College, or Grandview University.
	
	The **online portion** of the workshop provides extended support for educators through a Moodle platform. Through this platform the IALF can extend STEM connections to the classroom by providing educators with digital copies of lessons and resources. It makes space for teachers to share and collaborate on developed resources. The online platform also provides space for educators to network past the initial workshop through discussion forums, development of integration plans and classroom resources.
	
	Requirements to Implement the Program:
	1.) Educator(s) must attend both days of the professional development.
	2.) Educator(s) must participate in the STEM Council Scale-Up Educator Survey.

Website:
https://www.iowaagliteracy.org/

Videos:
- YouTube: @IowaAgLiteracyFoundation

Social Media:
- FB: https://www.facebook.com/iowaagliteracy
- IG: @IowaAgLiteracyFoundation
- X: @IowaAgLiteracy

Informational Webinar(s)
- January 25, 2024, at 3:30-4:00pm CST via Zoom

Iowa Standards Alignment:
Our program integrates lessons aligned to Iowa Core Standards and National Agriculture Literacy Outcomes (NALOs). We have developed crosswalk documents that align over 90 Iowa Core science and social studies (SS) standards to NALOs.

We carried that process further and developed phenomena examples in agriculture that can be used to connect to science/social studies. The phenomena are written as questions that students can explore through teacher guided inquiry. Throughout, math, technology, and engineering principles are integrated.

Our materials align with 21st Century Skills where appropriate and Social Studies Standards, which integrate 21st Century Skills. We have 15 math lessons on our website and an additional 30 on the National Agriculture in the Classroom website. We are currently working with educators to develop a math crosswalk document.

Our program provides educators with multiple lessons that can be used within a longer unit. These lessons often include the following standards as examples:

- 3-5-ETS1-1: identify simple design problems in the engineering of livestock facilities or food production to determine solutions to a problem and test prototypes. Often, this standard is paired with measurement, tool use, and graphing (e.g., 2.MD.A.1, 5.G.A.2, 7.G.A.1)
- 21.6-8.HL.4: resources that focus on the nutrition and marketing of food such as turkey, beef, and grapes.
- SS.4.26: participants engage in discussion and activities that align with the change in Iowa's agriculture overtime.

Professional Development:
Duration: 2 in-person consecutive eight-hour days (more online for educators electing to earn credit)
Date(s): TBD - Occurring between July 15, 2024, and October 31, 2024. (Note: Workshops are a full day and run from 8:00am-4:00pm).
Location: TBD - One will be held in each of the six regions

Photos:

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

GRADE LEVELS: 4-12	**2024-2025 STEM Scale-Up Program Summary:**
	FUSE is a research-based STEAM education program for middle and high school students, developed at Northwestern University. FUSE creates onramps to deeper STEAM engagement through a choice-based, interest-driven approach. Research shows that FUSE students identify new STEAM interests and develop their 21st century skills.
Educational Setting: Both in school and out of school.	CHALLENGES: FUSE offers 30+ unique, leveled Challenges, which introduce STEAM concepts and skills in an engaging way. Topics include coding, robotics, architecture, energy, 3D printing, music, engineering, and design. Each Challenge utilizes contemporary, real-world technology aligned with professional career pathways, and each is designed to appeal to students. Try a Challenge here!
Award Provides: ● FUSE Innovate Bundle ● $400 materials credit ● Two-day PD training in summer 2024 ● Ongoing support	LEARNING PLATFORM: Our website provides various resources for students to follow their interests within (and even beyond) the FUSE Challenges. FUSE provides detailed step-by-step video tutorials for students; videos are captioned in English and Spanish. Educators use the facilitator tools on the website to manage Challenges, track student activity, and receive support.
Additional Cost(s) to Awardee in 2024-2025: ● None	FUSE STUDENTS: Student choice and student interest drive the FUSE experience. Students choose which Challenge to try, whether to work independently or collaboratively, and even when to move on to something new. Research shows that this choice amplifies student engagement and persistence in FUSE. Students develop expertise based on their interests, and the FUSE environment provides significant opportunities for peer learning and sharing.
Approximate Sustainability Cost After Award Period: ● Annual 12-month site license costs $6,000; Iowa Scale-Up participants will receive a 25% discount for the first renewal year ($4,500).	FUSE FACILITATORS: Educators with diverse backgrounds serve as FUSE Facilitators across the country. The FUSE facilitator is a guide, providing resources, fostering collaboration, and inspiring student agency, choice, and real-world connections. **Requirements to Implement the Program:** ● Dedicated facilitator: an educator who is willing and excited to learn new technologies alongside their students, to support students as they make their own discoveries through FUSE ● 1:1 student device: Chromebooks, laptops, and desktops are compatible with FUSE. Chromebooks need to have at least 4GB RAM; if using Chromebooks, partner organizations will also need to provide at least two full computers for installed software, to support 3D printers and vinyl cutter. ● Reliable high-speed internet, capable of supporting multiple simultaneous video streams ● Dedicated room: a place with plenty of workspace for individuals and groups, at tables (or desks) and on the floor, with room to store kits and materials. Ideally, dedicated tables for equipment (3D printers and vinyl cutter) ● Dedicated time: a regular, scheduled opportunity for students to engage in FUSE; FUSE team will provide implementation guidance, recommendations, and support during onboarding and training ● IT support to help with software installation, whitelisting, and technical troubleshooting ● Educator(s) must participate in the STEM Council Scale-Up Educator Survey.

Iowa Standards Alignment:
FUSE is aligned to both NGSS and ISTE standards. FUSE also addresses several specific Iowa standards related to 21st century skills (particularly technology literacy), math, and science. Partial list below; here's a link to our full alignment for Iowa Standards.

21.6-8.TL.1 (Demonstrate creative thinking, design and development of innovative technology products or problem solving): FUSE challenges require students to learn new technology, iterate creatively, and persist until they achieve objectives. For example, in our 3D printing challenges, students learn to use 3D design software (Tinkercad), iterate on designs, and troubleshoot problems.

21.6-8.TL.2 (Collaborate with peers, experts and others using interactive technology): One unique element of FUSE is that different students gravitate toward and become experts on different technologies, based on their interests: Jose might become a coding expert while Sarah becomes a 3D printing expert. These "relative experts" then engage in peer-to-peer helping, leadership, communication, and collaboration.

21.6-8.ES.2 (Adapt and adjust to various roles and responsibilities in an environment of change): FUSE Challenges lend themselves to collaboration, and students play multiple roles, listening to others' ideas, testing those ideas, and adapting their designs based on the feedback. "What if we try it like this?" is a common expression heard in FUSE, and students embrace creative collaboration.

Professional Development:
Duration: two days, in person
Date(s): TBD
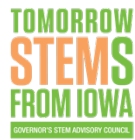**Location:** STEM Regions

Photos:

Moments in FUSE: Collaborating on Gel Chemistry (upper left), coding a robot (lower left), sharing a cookie cutter design & successful 3D print (center); working on a marble roller coaster (upper right); designing and 3D printing in FUSE (lower right, with 3D printers)

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

Investigating Everyday Phenomena

GRADE LEVELS: K-5	**2024-2025 STEM Scale-Up Program Summary:**

GRADE LEVELS:
K-5

Educational Setting:
Both in school and out of school.

Award Provides:
- One of each of the modules for one grade level of your choice
- Attend one 2-hour virtual training session.

Additional Cost(s) to Awardee in 2024-2025:
- Not Applicable.

Approximate Sustainability Cost After Award Period:
- Price Range: $19.99-79.99*

*Prices may vary and are subject to change

2024-2025 STEM Scale-Up Program Summary:
Investigating Everyday Phenomena is a K-5 science program designed to captivate young minds while demystifying real-world phenomena.

Key features:
- Grade-Level Modules: four modules per grade (K-5), covering life, earth, and physical sciences; and engineering.
- Accessible Learning: module comprises of five lessons under 30 minutes, seamlessly fitting into existing curricula.
- Standards-Aligned: adheres to educational standards, ensuring students meet essential requirements.
- Hands-On Exploration: hands-on investigations centered on real-world phenomena.
- Embedded Literacy Skills: students explore and develop literacy skills, enhancing their ability to communicate scientific ideas.

Module contents:
- Comprehensive Resources: Materials for 30 students per module ensure two years of use.
- Teacher Support: Comprehensive Teacher Guides offer step-by-step instructions, assessments, and guidance.
- Differentiation and EL Support: We cater to diverse student needs with differentiation and English Language (EL) support.
- eBook Access: A three-year Teacher eBook license includes phenomena videos, images, and how-to videos that enrich the learning experience.

Requirements to Implement the Program:
- Educator(s) choose (1) grade level of Investigation Everyday Phenomena and attend a 2-hour Virtual Training session.
- Educator(s) must participate in the STEM Council Scale-Up Educator Survey.

Iowa Standards Alignment:
- Investigating Everyday Phenomena modules meet 21st Century Learning Skills and the Iowa's Academic Science Standards.
- Solutions for Drought, a 3rd grade Investigating Everyday Phenomena, is a perfect example of the standards alignment design of this program. In this module, students make a claim about the merit of a solution to a real-world problem, drought, which causes environmental changes (IA 3-LS4-4). This module integrates the engineering design process as well as the science and engineering practices. Students respond to the phenomenon much like an environmental engineer, all the while practicing 21st century skills. This module also aligns with Iowa's Academic Science Standard IA 3-5-ETS1-1, 2, and 3.
- Another example of how Investigating Everyday Phenomena is aligned to the standards is the module Weathering and Erosion. This 4th grade module focuses on students making observations and/or measurements to provide evidence of the effects of weather on the rate of erosion (IA 4-ESS2-1).
- One can also see standards alignment by examining the 5th grade module, Movement of Matter. This module is designed around the standard IA 5-LS1-1 where students support their argument that plants get the materials, they need for growth chiefly from air and water. Standard 5-LS2-1 also aligns to this module.
- See how the programs relate to all K-5 Standards.

Website:
https://www.hand2mind.
com/iowascaleup

Videos:
- Free 30-Day Trial of
  the Full K-5 Suite
- Unboxing Video

Social Media:
- Insta: hand2mind
  (@hand2mindinc) •
  Instagram photos
  and videos
- FB: Hand2mind -
  Home | Facebook
- X: hand2mind
  (@hand2mind) /
  Twitter

**Informational
Webinar(s):**

February 6 at 4pm CST

Register Here:
https://us02web.zoom.us
/meeting/register/tZ0pdO
murjIrHdbMdTOK4E0wy
hph3J0FA7O0

Professional Development:
Duration: 2 hours of virtual training
Date(s): July 16th (AM), July 17th (PM), July 24th (PM), and July 25th (AM)
Location: Virtual

Photos:
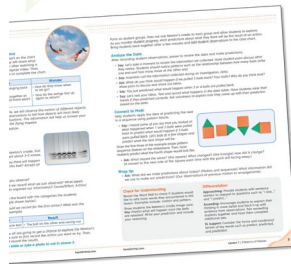
It all starts with a phenomena!
Give students a hands-on program that helps them explore 3D science and engineering concepts.

Explore Now

4 modules per grade cover:
- *Life Science*
- *Physical Science*
- *Earth Science*
- *Engineering*

Explore Grade-Level Kits

PATTERNS OF MOTION — PHYSICAL SCIENCE — Teacher Guide
SOLUTIONS FOR DROUGHT — ENGINEERING — Teacher Guide
ANIMAL SURVIVAL — LIFE SCIENCE — Teacher Guide
WEATHER PATTERNS — EARTH SCIENCE — Teacher Guide

Teacher Guides contain everything teachers need including:
- *Student Progress Assessments*
- *EL Support*
- *3-year eBook license*

Learn More

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

Making Innovative STEM Connections

GRADE LEVELS:
PreK-8

Educational Setting:
Both in school and out of school.

Award Provides:
- Two full days of Professional Development
- Maker kit with materials to activate youth experiences including a variety of materials for a classroom of 20
- Educator stipend/sub-pay available ($120/day) to attend professional development
- Travel stipend available ($50) to attend professional development
- Lodging stipend available ($100) for overnight stay

Additional Cost(s) to Awardee in 2024-2025:
- Opportunity for teacher license/graduate credit.

Approximate Sustainability Cost After Award Period:
- Annual consumable replacement costs do not exceed $200

2024-2025 STEM Scale-Up Program Summary:

Making Innovative STEM Connections (MISC) 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.

MISC includes a review of pedagogy, ideation around classroom connections, exploration of materials, and exposure to tools and equipment found in makerspaces. Included in the program are lesson-design prompts designed to develop STEM principles and enhance those already existing in classrooms by using maker materials to develop workplace readiness skills. This lesson design framework focuses on the idea that making and tinkering are ways to engage student's minds and build conceptual understanding around academic content.

MISC PD launches with a two day in person training to focus on the history, supporting research, and pedagogy related to making. In person training includes hands-on experience-based learning about the kit materials, curriculum alignment/implementation tools, safety guidelines, and strategies for inspiring the maker mentality.

MISC shows educators how to bring structure and guidance to making activities. Teachers learn how to infuse "making" into existing curriculum using inquiry-based methods to create learning experiences unique to each classroom and each student. In doing this, teachers become makers of their own curriculum and classroom activities, improving student understanding and achievement.

Awardees will be able to select from the kit options listed below:

Making Innovative STEM Connections kit options	
Science and Circuits	Pocket Lab Sensor 10 pk with accessories, electronics, and paper circuit kits
Mini Makers	Sphero Indi Class Pack, 2 Strawbees STEAM Classroom Packs, 2 3DUX Design kits with accessories
Robots and Coding	12 Root Robots, class pack of microcontroller inventor kits

Requirements to Implement the Program:
- Educator(s) must participate in two consecutive days of training at the Science Center of Iowa.
- The Science and Circuits kit as well as Robots and Coding kit have materials that require a computer or internet capable device.
- Educator(s) must participate in the STEM Council Scale-Up Educator Survey.

Website:
https://www.sciowa.org/education/professional-development/educators/making-stem-connections/

Videos:
- https://www.youtube.com/watch?v=sRLWF332Dpg

Social Media:
- X: @sciowamakers
- Facebook: SCI Making STEM Connections

Informational Webinar(s):

Jan 23 1:00 pm
https://us06web.zoom.us/j/85664092786?pwd=h1oNaL0LeKgUYHz1KV3xZ9vGUa2W0u.1
password: 387966

Jan 25 4:30 pm
https://us06web.zoom.us/j/85448838477?pwd=Z2SbsOii3bZaw0LUZwCx67p0OXjUzM.1
password: 607407

Iowa Standards Alignment:

K-12 Computer Science Framework
  Algorithms and Programming
  Data and Analysis
  Impacts of Computing

NGSS
  ETS1: Engineering and Design
  ETS2: Links Among Engineering, Technology, Science and Society
  PS1: Matter and its interactions

Iowa's Academic Standards
  Literacy Skills
  Math Skills
  Social Studies Skills
  21st Century Skills

Professional Development:
Awardees can select _one_ of the six training sessions. All sessions will be held at the Science Center of Iowa in Des Moines.
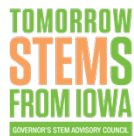
Duration: 2 days

Date(s): July 15-16, July 22-23, July 25-26, July 29-30, August 5-6, or September 12-13

Location: Science Center of Iowa's Innovation Lab, 401 W. MLK Jr. Pkwy, Des Moines

Photos:

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

Positive Physics, Chemistry, Physical Science, Biology, Environmental Science & Engineering

GRADE LEVELS: 6-12 **Educational Setting:** This program is best implemented in situations where the same students meet for the full implementation, rather than drop in and out for a lesson or two. **Award Provides:** ● Training sessions ● One-year teacher subscription to online platform ● All student subscriptions to online platform for academic year 24-25 ● $100 stipend for attendance of required workshop ● On-going support **Additional Cost(s) to Awardee in 2024-2025:** ● No additional cost necessary. **Approximate Sustainability Cost After Award Period:** $299/Teacher/Year (includes unlimited student subscriptions)	**2024-2025 STEM Scale-Up Program Summary:** Positive Physics, Chemistry+ (website: positivephysics.org) is an engaging lesson and problem bank for Middle & High School Science. The site was built by teachers in diverse classrooms and designed to be accessible to students on any level from middle school to AP. > 5000+ Interactive questions & video lessons designed to replace a textbook. > Immediate feedback & automatic grading. > Randomization to prevent copying. > Nurturing environment to build student confidence. > Response customer service (contact jack@positivephysics.org with any questions). > 1 Minute Intro Video **Reviews from Last Year's Iowa Awardees:** "My chemistry, physics, and physical science students LOVE using positivephysics.org!" - Launa Buxton (East HS, Waterloo) "Positive Physics is one of the best online programs I've used in my many years of teaching. It is easy to use and tailor to my personal needs and preferences. Students are very engaged in the lessons and practice!" - Liz Moritz (Midland HS, Midland) "This resource has been an amazing addition to my classroom this year! The assignments allow students to discuss strategies instead of sharing answers because numbers are randomized so that no two students will have the same answer." - Anna Pauley (Atlantic High School, Atlantic) "The site is fantastic. It is great for new learning and for review. I had a student today that told me she felt really good after completing the lesson on velocity graphing from yesterday because she was struggling, and she now understands the concept. She said it feels good to go from struggling to understanding. Jack is also personally very responsive to any question and welcomes feedback." - Brad Horton (Kennedy High School, Cedar Rapids) **Requirements to Implement the Program:** 1.) Educator(s) must participate in one, one-hour workshop (Teacher will receive $100 attendance stipend) 2.) Educator(s) must participate in the STEM Council Scale-Up Educator Survey.

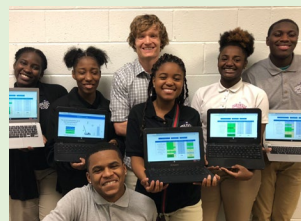|	
Website: https://www.positivephysics.org/ **Videos:** https://www.youtube.com/embed/9bhDEkuJsyI?autoplay=1 **Social Media:** N/A **Informational Webinar(s):** Wed, Jan 24 at 3:30pm (Register Here) Wed, Feb 21 at 3:30pm (Register Here) Happy Physics & Chemistry Students	**Iowa Standards Alignment:** Positive Physics and Chemistry is designed to cover all topics covered in the following courses: Physics (including AP) Chemistry (including AP) Biology (including AP) Environmental Science (including AP) Physical Science Engineering In addition, each unit begins with an inquiry activity that is based on the NGSS/Iowa standards. Three inquiry activities with strong curricular ties are described below and full NGSS alignment can be found on the site. **HS-PS2-1:** Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. [See Unit 5 Inquiry] **HS-PS2-2:** Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system. [See Unit 14 Inquiry] **HS-PS3:** Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects). [See Unit 13 Inquiry]. **Professional Development:** **Duration:** One hour **Date(s):** Various in July & August, please see: https://calendly.com/jreplinger/iowa **Location:** Virtual through Zoom **Photos:**

| Physics Example Question | Chemistry Example Question |

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

![Tomorrow STEMs from Iowa | STEM Scale-Up Program]

Robo Wunderkind STEM Program

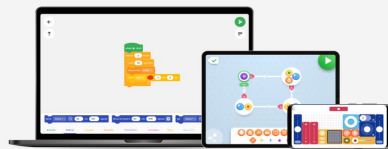|	
GRADE LEVELS: K-5 **Educational Setting:** Both in school and out of school. **Award Provides:** ● 12 Modular Robotics Kits ● Robo Wunderkind Coding App ● STEAM Hub (web-based content platform that holds standards-aligned curriculum and support resources) ● 1:1 Robo Wunderkind mentoring calls (up to 10) **Additional Cost(s) to Awardee in 2024-2025:** ● None **Approximate Sustainability Cost After Award Period:** ● $4,900 building license for program renewal	**2024-2025 STEM Scale-Up Program Summary:** Robo Wunderkind is a comprehensive STEAM program for K-5 schools that works right out of the box. Our robotics and coding platform empowers students to design and code their wildest imaginations. Our program offers easy-to-use building blocks and a series of age-appropriate coding apps that develop computational thinking skills and spark a curiosity for STEAM in young learners. The modular robotics kit allows students as young as five to prototype, design, and build robots in no time, using the engineering design process. The color of our blocks represents functionality: orange for sound, yellow for light, blue for motion, green for electrical connections, and red for sensors like distance, motion, and light. With a wide range of features, students' robots are only limited by their imagination!

Robots truly come to life with our coding app. The Robo Wunderkind app has three interfaces - Robo Live, Robo Code, and Robo Blockly. Thanks to an intuitive icon-based coding interface, prior coding experience is not required to create complex programs for any type of robot. Further, the visually based coding experience found in Robo Live and Robo Code make coding accessible to all students as they require no reading skills to use.

STEAM Hub is a content platform hosting a comprehensive library of standard-aligned lesson plans, coding challenges, and playful and customizable curricula for grades K-5. All lessons are turnkey and ready-to-run to decrease teacher workload. Further, STEAM Hub hosts professional development (PD) resources that can be consumed on-demand. We design our PD resources intending to empower all teachers with the skills, strategies & confidence to effectively teach coding and basic robotics in various lessons.

Requirements to Implement the Program:
● Each modular robotics kit comes with a USB charger to keep your robot's battery charged. We recommend schools purchase a USB charging hub so multiple robots can be charged simultaneously.
● The Robo Wunderkind coding app is compatible with iOS, Android, macOS, Chrome OS, and Windows and thus can run on mobile devices, tablets, notebooks, Chromebooks, as well as desktop computers.
● Educator(s) must participate in the STEM Council Scale-Up Educator Survey.

Website:
www.robowunderkind.com

Videos:
https://rb.gy/j9y2m0

Social Media:
- Insta:
  https://www.instagram.com/robowunderkind
- FB:
  https://www.facebook.com/groups/wunderteacher/
- X:
  https://twitter.com/RoboWunderkind

Informational Webinar(s):

Join us at the upcoming Scale Up with Robo Sessions to learn more (a recording will be available)!

REGISTER NOW
January 18, 2024
4:30 PM CST

January 23, 2024
7:00 PM CST

Iowa Standards Alignment:
Our curriculum library hosts Iowa's Academic Standards-aligned content integrating STEM into ELA, math, and science. More detailed information on the selection of our K-2 content and its alignment to the Iowa's Academic Standards for ELA, Math, and Science can be found here.

In addition, the Robo Wunderkind program is your best resource for building K-5 students' computer science skills outlined by the Iowa Computer Science Standards. Any time students build and code robots, they work on key standards that build their knowledge of computer science and coding while practicing essential computational thinking skills. Key standards include:
- 1A-AP-08 Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks.
- 1A-AP-10 Develop programs with sequences and simple loops to express ideas or address a problem.
- 1A-AP-11 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
- 1A-AP-14 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.

Professional Development:
Duration: 6 hours
Dates: July 15 - Aug 9, 2024
Location: STEM Regions

Photos:

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

Spatial Vis: The First Step in Design for Engineering and Technology

GRADE LEVELS:
6-12

Educational Setting:
Both in school and out of school.

Ideal for Engineering and CTE programs. Prepares students for engineering design, drafting, shop, and CAD.

Promotes design, creativity, and teamwork in middle and high school.

The Spatial Vis software can be used in person or at home.

Hands-On Activities and the Better Than the Egg Drop challenge should be done in person.

Award Provides:
● Professional Development
● Two 3-hour live synchronous zoom sessions (required),
● 6 hours of asynchronous activities (required),
● Four 2-hour optional office hour Zoom sessions
● $240 educator stipend
● Spatial Vis Classroom Kit (non-consumable)
● Better than Egg Drop Classroom kit (consumable)
● Spatial Vis software licenses for students (1-year license)

2024-2025 STEM Scale-Up Program Summary:
Spatial Vis aims to increase the number of students who become engaged and succeed in STEM, especially in the areas of engineering and technology. A key first step is becoming proficient with spatial visualization, which is the ability to think in 3 Dimensions (3D). Spatial visualization is a skill that is fundamental for many STEM careers but is under-taught. Luckily, spatial visualization is a learnable skill, especially through the act of sketching objects.

Spatial Vis software teaches sketching of 2D and 3D views with automated grading and personalized feedback. We will show teachers how they can build upon these skills to have students complete design projects at a high level.

The curriculum will prepare students for careers in Iowa, including the ability to read blueprints needed to assemble machines, learn Computer Aided Design (CAD), 3D print, and pursue engineering. The curriculum has been shown to increase spatial visualization skills in standardized tests, which has, in turn, led to increased student GPAs in STEM.
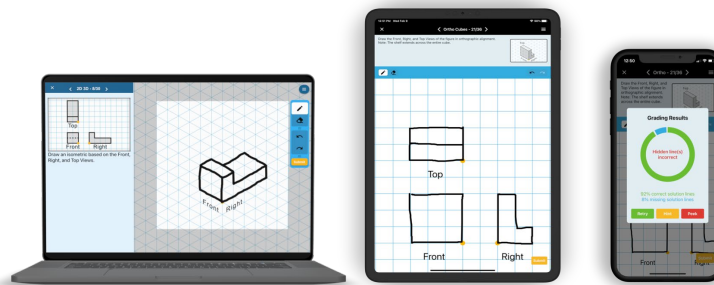
FREE Spatial Vis ACCESS FOR SPRING 2024 SEMESTER!
Iowa teachers and their students may access Spatial Vis for free for the Spring 2024 Semester! Email info@egrove.education for more information.

Teacher Reviews
"My students almost all resoundingly love Spatial Vis. Many go beyond what I have assigned and even work ahead they enjoy it so much." - Mr. Greenberg (Lovett School)

"Excellent tool for remote learning or in-person learning. Helps students develop important skills for CAD and Technical Sketching" - Mr. Fullington (Shelton High School)

"This app really teaches students how to hand sketch single views, orthographically, isometrically, and 3D visualizations without advanced verbal instruction" - Mr. Arnett (Hampton High School)

"A former student visited school and shared that his engineering and chemistry college classes are challenging. He expressed pride in excelling in a class with a high failure rate. The curriculum's emphasis on spatial visual reasoning, which he learned two years ago in my junior class, has contributed to his success." - Ms. Bertke, PE (Piqua High School)

Requirements to Implement the Program:
● Complete full professional development: two 3-hour live synchronous zoom sessions and 6 hours of asynchronous activities.
● Students will need access to at least one of these devices: Chromebook or Computer with Internet Access, Apple iPhone, Apple iPad, Android Phone, or Android Tablet.
● Participate in the STEM Council Scale-Up Educator Survey.

|	
Additional Cost(s) to Awardee in 2024-2025: ● None **Approximate Sustainability Cost After Award Period:** ● $15/student annual license ● $100 for Better than Egg Drop Activity consumable materials. **Website:** https://egrove.education **Videos:** https://youtu.be/Y46cPtlkXoQ **Social Media:** @egroveeducation (Facebook) (X) (Instagram) **Informational Webinar(s):** **Registration Link:** https://egrove.education/iowa-stem-scale-up **Webinar Date(s):** Monday 01/22/24 4pm - 5pm **Recorded webinar will be available at** https://egrove.education/iowa-stem-scale-up	**Iowa Standards Alignment:** ● High School CTE - Applied Sciences, Technology, Engineering and Manufacturing Standards (Drafting and Design (DFT4, DFT10), Engineering and Design) ● Middle School CTE - Applied Science, Technology, Engineering and Manufacturing Service Area Standards (3. Understand the engineering design process) ● Middle and High School Engineering Design (MS-ETS1, HS-ETS1) ● 21st Century Skills in the area of Employability Literacy (21.6-8.ES.1, 21.9-12.ES.1, 21.6-8.ES.4 and 21.9-12.ES.4) related to communication, productivity, creativity, skill mastery, and engaging in effective problem solving. ● Technology Literacy (21.6-8.TL.2, 21.9-12.TL.2, 21.6-8.TL.4, 21.9-12.TL.4, 21.6-8.TL.6, and 21.9-12.TL.6) related to collaboration and critical thinking skills using interactive technology and facilitating learning technology applications (CAD) to produce finished products (technical design drawings). ● Some cross-curricular standards being met include common core mathematics for middle and high school geometry, such as drawing geometrical figures (CCSS.Math. Content.7-12. G. A), understanding properties of rotations (CCSS.Math. Content.7-12. G. A)), applying geometric concepts in modeling situations (CCSS.Math.Content.HSG-MG. A) and identifying shapes of 2D cross sections of 3D objects (CCSS.Math.Content.HSG-GMD.B). ● Finally, by teaching 2D/3D sketching and how this integrates into the iterative design process, this program meets crosscutting standards in the arts such as communication, collaboration, creativity, critical thinking and problem-solving. Students learn how to document the early stages of the creative process visually and generate plans for creating designs (VA: Cr1.1.8a and VA: Cr1.1. Ia-IIIa). **Professional Development:** **Duration:** Two 3-hour Synchronous Webinars, ~6 hours asynchronous training (Optional: Four 4-hour optional office-hour zoom sessions.) **Date(s)*: Part 1:** Tuesday 07/30/24 9am - 12pm **| Part 2:** Tuesday 08/06/24 9am - 12pm **Part 1:** Wednesday 08/07/24 4pm - 7pm **| Part 2:** Wednesday 08/14/24 4pm - 7pm **Location:** Virtual *Recipients have the option to attend Part 1/Part 2 of a different session. More professional development dates will be added as needed. **Photos:**
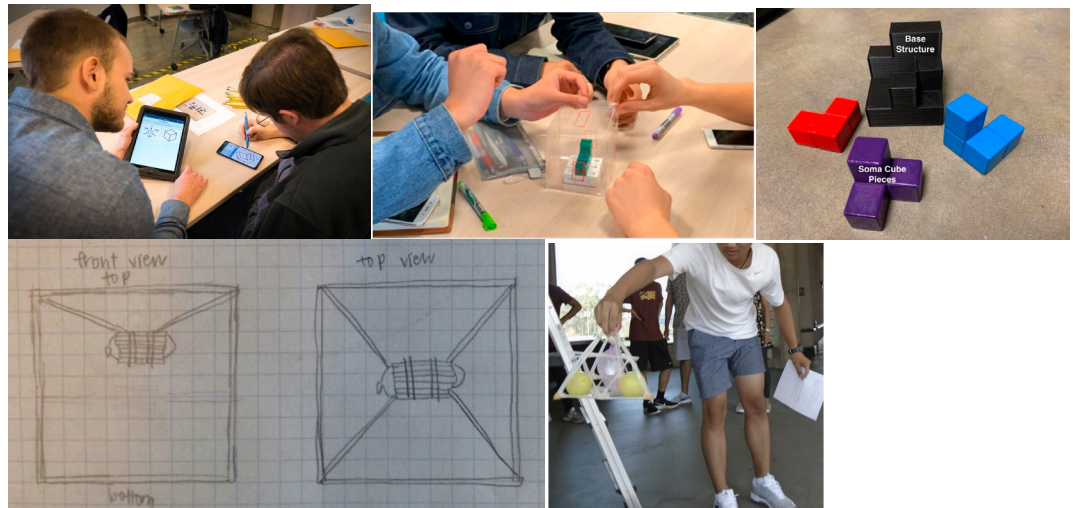
STEM Scale-Up Program Application Link: www.IowaSTEM.org/Scale-Up-Application

Storytime STEM-packs: STEM + Computer Science PreK-2

GRADE LEVELS:
PreK-2

Educational Setting:
Both in school and out of school.

Award Provides:
- **1 Storytime STEM +Computer Science Adventure** (choose either: Moon Adventures, Dragonland Adventures, Earth Day Adventures, Blue Girl, Happy Planet, or the new Blue-Bot Mouse Adventures)
- **1 Science or Engineering Design Storytime STEM-pack** (choose 1 from 10 titles)
- **1 Mathematics Storytime STEM-pack** (choose 1 from 7 titles)

For detailed descriptions please see:
[Storytime STEM Materials Description](#)

Additional Cost(s) to Awardee in 2024-2025:
- No additional cost

Approximate Sustainability Cost After Award Period:
- Refurbishment costs for consumable materials range between $10.00 and $20.00 per Storytime STEM+C Adventure, and between $ 0.00 and $12.00 per Storytime STEM-pack.

2024-2025 STEM Scale-Up Program Summary:
Storytime STEM-packs are a PreK-2 educational innovation designed to connect children's literature with STEM and computer science. They enable educators of young children to successfully incorporate age-appropriate STEM+C concepts into children's programming.

Using the storybook as context, Storytime STEM-packs present children with a phenomenon or problem. Through engagement in the practice standards for science, engineering, or mathematics, and the use of a crosscutting concept, children collaboratively explain the phenomenon or solve the problem, thereby making sense of the STEM concept. The facilitation guide offers suggestions for open-ended questions to elicit children's thinking and promote discussion.

Developed as part of a National Science Foundation I-Corps grant, Storytime STEM-packs are fun and engaging for kids, easy to use with minimal preparation time, and aligned to Next Generation Science, Common Core Mathematics Standards and CSTA Computer Science Standards, also with alignment to Iowa content and 21st century standards.

Storytime STEM-packs can be used in classrooms, as centers, in STEAM labs, as well as public libraries, STEM camps, out-of-school programs, and summer school. It takes approximately 45 minutes to complete one Storytime STEM-pack and 45 minutes to complete one learning challenge within each Storytime STEM+C Adventure. There are a total of five learning challenges in an Adventure.

Included in each Storytime STEM+C Adventure:
- 3 Storybooks
- Facilitator guides for each of the five learning challenges (each 45 min)
- Print materials
- Hands-on materials for 24 children
- 6 colorful themed vinyl mats
- 6 Bee-Bots (Blue-Bots for Mouse Adventures) with charging station

Included in each Storytime STEM-pack:
- 1 Storybook
- A facilitator guide with STEM-background and lesson plan (45 min)
- Print materials
- Hands-on materials for 24 children

Requirements to Implement the Program:
1. Educator(s) choose
   - 1 Storytime STEM+C Adventure
   - 2 Storytime STEM-packs (1 science/engineering and 1 mathematics)
2. Attend the 3-hour professional development
3. A memorandum of understanding signed by the organization's appropriate signatory is required before materials can be delivered.
4. Educator(s) must participate in the STEM Council Scale-Up Educator Survey.

Iowa Standards Alignment:
Storytime STEM+C Adventures focus on building foundations in computational thinking/computer science in PreK-2 and integrate science, engineering design, mathematics, and 21st Century Standards including the Employability Skills:21.K-2.ES.1, 21.K-2.ES.2, 21.K-2.ES.4, and Technology Literacy: 21.K-2.TL.1, 21.K-2.TL.3, Science Standards K-2-ETS1-1, K-2-ETS1-2, and K-2-ETS1-3, and mathematics standards K.GA &B, K.C.C.B, 1.OA.C, For a listing of all standards, please see the Storytime STEM Materials Description.

Professional Development:
Professional development includes an introduction to Storytime STEM-packs, facilitation support and engagement in parts of your selected Storytime STEM+C Adventure and facilitation support for math and science Storytime STEM-packs.

Duration: 9 a.m. – 12 p.m. (3 hours)
Date(s): Depending on your Adventure selection, **attend one** of these dates: July 16, 17, 18, 23, 24, 25
Location: Synchronous virtual

Photos:

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

Teachley Math

GRADE LEVELS: K-5 **Educational Setting:** Both in school and out of school. **Award Provides:** ● 12-month license for 1 educator, up to 25 students ● K-5 math lessons & printable activities ● Adaptive math games ● Animated videos and eBooks ● Formative assessment data ● Printable student certificates of mastery ● Physical kit includes laminated math posters and set of 5 graphic fiction books ● Half-day PD training ● Year-round support via email, virtual office hours, webinars **Additional Cost(s) to Awardee in 2024-2025:** Not Applicable **Approximate Sustainability Cost After Award Period:** ● Full renewal (digital + physical kit): $288 ● Digital-only renewal: $229	**2024-2025 STEM Scale-Up Program Summary:** ***Teachley Math*** is an essential math learning program that teaches foundational concepts to every student. Teachley enhances K-5 core math curricula by building students' conceptual understanding, fluency, and problem-solving skills across addition, subtraction, place value/base ten, multiplication, fractions, and measurement/data. Targeted lessons and formative assessment data support implementation and intervention efforts across elementary grades. ✴ **Supports all learners** - With a focus on strategy development, flexible thinking, and problem solving, strong visual and audio scaffolds support all students to succeed in math, especially those who struggle or are at-risk for math learning difficulties. ✴ **Deeply engaging** - Books, videos, adaptive games, physical activities, and lessons promote sustained math engagement during classroom, out-of-school, and at-home learning. ✴ **Designed by teachers -** Founded by teachers with PhDs in cognition and learning, teachers say it's like having another person in the room with them. ✴ **Targeted instruction -** The dashboard reports formative assessment data on benchmark skills and fluency progression to help educators easily target instruction and intervention. ✴ **Research-based** - Developed with over a decade of grant-funded research by the U.S. Dept. of Education, National Science Foundation, and National Institutes of Health, *Teachley Math* is an award-winning program trusted by thousands of educators and recognized by Digital Promise as a Research-based Certified Product. ***Teachley Math*** helps raise student achievement and level the playing field for all learners. We're on a mission to #MakeMathFun and ensure ALL elementary learners succeed in math. ***Join us!*** **Requirements to Implement the Program:** 1) Educators must attend a half-day of in-person training. *A paid stipend of $120 and travel reimbursement, up to $50 per awarded educator.* 2) Educators will need access to the Internet and some technological devices (e.g., Chromebook, iPad, etc.) but <u>do not</u> need to have 1-to-1 devices. 3) Educators must participate in the STEM Council Scale-Up Educator Survey.

Website:
www.teachley.com/iowa-stem

www.teachley.com

Videos:
- https://youtu.be/FvZoG6ecv98

Social Media:
- twitter.com/teachley
- facebook.com/teachley
- www.pinterest.com/teachley

Informational Webinar(s):
Free webinars will be hosted at 4pm CT on the following dates:

- Wed., Jan. 17, 2024
- Mon., Jan. 29, 2024
- Tue., Feb. 13, 2024

To register, visit:
www.teachley.com/iowa-stem
(scroll until you see the webinar heading):

Iowa Standards Alignment:
Teachley Math covers a wide span of K-5 Mathematics standards, below is a small sampling of standards addressed by the program.
- **Standards for Mathematical Practice** (Covers all MP standards 1 - 8)
- **Operations and Algebraic Thinking (**K.OA.A, 1.OA.C, 2.OA.B)
- **Number and Operations—Fractions** (3.NF.A.1, 4.NF.A.1, 5.NF.A.1)

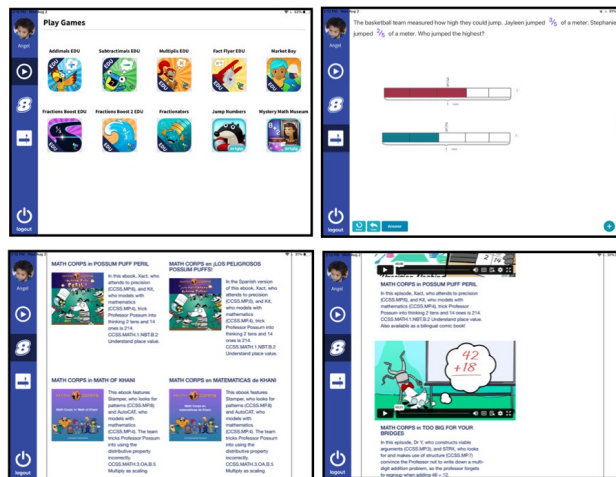See full standards alignment by visiting www.teachley.com/iowa-stem.

Professional Development:
Duration: ½ day PD training
Date(s): PD opportunities will occur the first two weeks of August 2024
Location: Pending the number of Scale-Up awards, each Iowa STEM region may host an in-person PD.

Photos:

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

Turing Tumble: Build Marble-Powered Computers

|	
GRADE LEVELS: 3-12 **Educational Setting:** Both in school and out of school. **Award Provides:** 30 Student Bundle, including everything required for play & instruction: ● 15 kits for 30 students ● 6 marble reloaders ● 6 extra parts packs ● Educator Guide PDF ● 4 hr. in-person training ● $50 Visa gift card **Implementation Time:** May be used for full-semester programming or as an extension activity **Additional Cost(s) to Awardee in 2024-2025:** None **Approximate Sustainability Cost After Award Period:** None. Extra parts included.	**2024-2025 STEM Scale-Up Program Summary:** Turing Tumble is a revolutionary STEM game that teaches how computers work at a fundamental level. Students build marble-powered, mechanical computers to solve a series of structured logic puzzles, using their own hands instead of a screen. It looks like a fun marble run, has an engaging graphic novel woven through the puzzle book, and is the first STEM curriculum solution that allows students to grasp the fundamentals of how a computer works by hearing, seeing, feeling, and programming a mechanical computer. With Turing Tumble, students learn how to use logic to solve problems. In the process, they discover how coding works while building confidence in computational thinking. Click here to see Turing Tumble in action **Materials Include:** 30-Student Bundle: Turing Tumble games, Marble Reloaders, extra parts, complete puzzle books, and PDF of the Educator Guide **Requirements to Implement the Program:** ● Attend a 4-hour, in-person professional development session (date TBD) in July or August. ● Educator(s) must participate in the STEM Council Scale-Up Educator Survey. **Professional Development:** **Duration:** Half-day (4 hours) of training **Date(s):** Dates will be announced in April 2024 **Location:** Trainings will be held in each of the six STEM Regions **Classroom Videos:** ● See how it works ● Introduction to classroom use ● Getting Started ● How Turing Tumble is a Computer

Website:
www.upperstory.com

Social Media:

⬤ @EndlessCuriosity

⬤ @UpperStoryCo

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⬤ @Upper_Story

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Informational Webinar(s):

Registration Link:
https://forms.gle/D5Ny8o
ZHnB4EyH939

Wed., Jan. 17, 11:30am
Zoom Link

Thurs., Feb. 1, 4:30pm
Zoom Link

Tues., Feb. 20, 7:00pm
Zoom link

One attendee at each webinar will win a free copy of Spintronics!

A recorded webinar will be available Jan. 18.

Iowa Standards Alignment:

Turing Tumble meets standards in computer science, science, math and 21st Century Skills. Turing Tumble meets CSTA standards in the concept area for programming and algorithms solidly through grade 5.

Follow this link for standards alignment for the following:

- CSTA
- NGSS
- Iowa's Academic Standards
- 21st Century Skills

Different Ages. Deeper Learning. Enjoyed by grades 3-12 and beyond.

Kids and teens learn best when they use their senses to explore new concepts. Turing Tumble teaches computational thinking, coding strategy, algorithms, programming, and other abstract concepts in a fun, tangible way that is hands-on and screen-free.

Educator Resources Include:

Follow this link for our educator resources described below:
- **Educator Guide:** A companion guide to assist educators in guiding students through the first 30 puzzles. It offers:
    - computer logic lessons
    - breakdown of concepts with classroom tips
    - troubleshooting suggestions for each puzzle
- **Classroom Videos:** Quick, engaging videos to get your students started and to walk through the differences between a mechanical computer and its electronic counterpart.
- **Practice Guide:** A detailed guide to ensure you're equipped to answer student questions. Including:
    - descriptions of how each challenge works to cement important concepts
    - black and white printables to share with the class
    - 30 extra puzzles to help bridge gaps and solidify what they've already learned
- **Educator Blog:** Whether you are a teacher, an administrator, a librarian, or an after school professional, our blog articles are a resource to incorporate Turing Tumble in your classroom or program. Explore our lesson plans on how to get started.

Questions? Contact us at hello@upperstory.com

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