STEM SCALE-UP PROGRAM

FUSE Studio - Innovate

GRADE LEVELS: 4-12 **Educational Setting:** Both in school and out of school. **Award Provides:** ● FUSE Innovate Bundle ● $400 materials credit ● Two-day PD training in summer 2024 ● Ongoing support **Additional Cost(s) to Awardee in 2024-2025:** ● None **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).	**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. 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! 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. 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. 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.
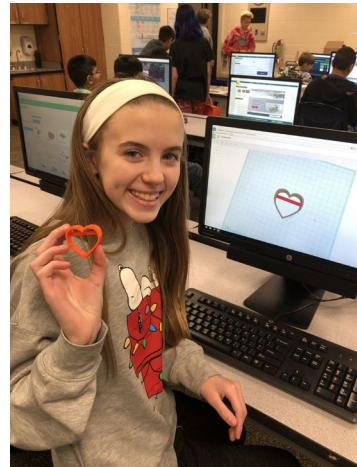

Professional Development:
Duration: two days, in person
Date(s): TBD
Location: STEM Regions

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