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

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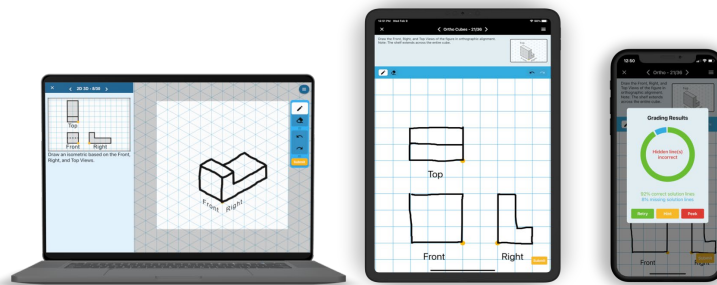
Award Provides:
- Professional Development
- Two 3-hour live synchronous zoom sessions (required),
- 6 hours of asynchronous activities (required),
- Four 2-hour optional office hour Zoom sessions
- $240 educator stipend
- Spatial Vis Classroom Kit (non-consumable)
- Better than Egg Drop Classroom kit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

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).
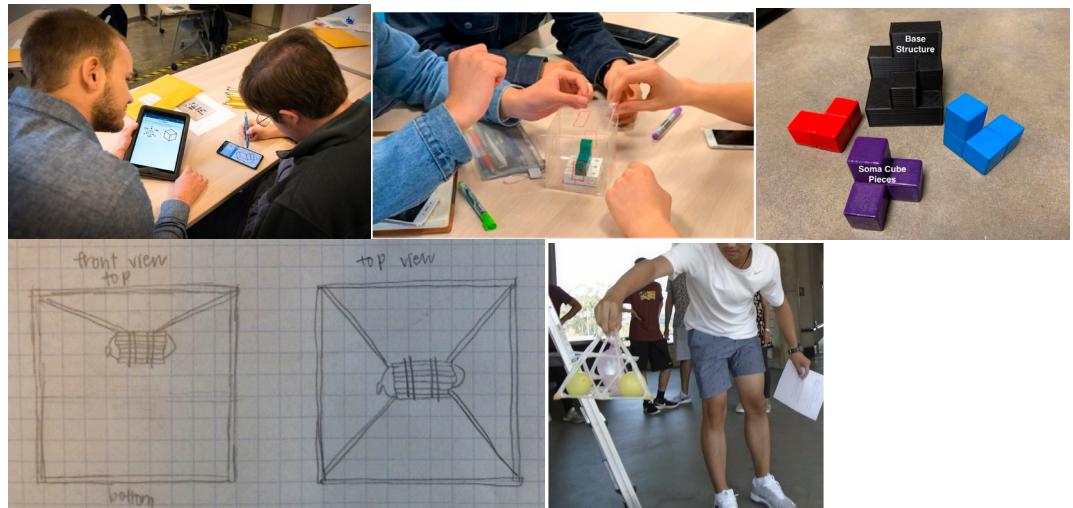
Professional Development:
Duration: Two 3-hour Synchronous Webinars, ~6 hours asynchronous training
(Optional: Four 4-hour optional office-hour zoom sessions.)

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