STEAM Challenge Grant – Request for Applications

The Vermont Agency of Education (AOE) invites supervisory unions/school districts (SUs/SDs) and the public schools and Career Technical Education centers they operate to complement and/or amplify their existing secondary school curricula by providing students an innovative learning opportunity to use STEAM learning principles to solve a problem within their communities or the state. Successful applicants will demonstrate their ability to organize interdisciplinary teams of at least five students and one licensed educator to identify a problem within the state; have a desire to understand the root causes of a problem; be able to leverage the expertise of their education community; and can create a sustainable solution using a STEAM approach.

This short-duration, competitive grant opportunity will make awards of no more than $25,000. The agency anticipates that most requests will be at $15,000 or less. The total amount of funding available for award is $150,000. AOE reserves the right to make no awards, should applicants not fulfill the eligibility requirements.

Application Due Date: January 20, 2023 (4:30 PM)
Anticipated Grant Duration: June 30, 2023
Number of Awards: Number of awards will be determined by the number of applications received and available funding.

For additional information, contact:

Lisa Bresler, Arts Specialist, at lisa.bresler@vermont.gov **Note:** All applicants interested in applying for this grant are **strongly encouraged to have a representative attend** the January 10 webinar; please request a meeting link from the contact above. Those who are unable to attend may request a recording of the webinar.

General Information and Background:

AOE is offering this competitive grant opportunity to support programs providing Vermont students with a holistic STEAM experience. The AOE defines STEAM as "an authentic, student-centered learning experience that targets the application and integration of the knowledge, skills, and practices of science, technology, engineering, the arts, and mathematics." (See Appendix B for more information.)

The goal of this grant opportunity is to begin building a coherent system of understanding regarding the tenets of STEAM education, and to provide structures for SU/SDs, public schools, and CTE centers in developing and sustaining STEAM programs that are aligned with state adopted standards, including those standards that may be currently under-addressed (e.g., arts, engineering, computer science, etc.).

The Challenge:

Are your students looking to make a difference in your community? Is there a problem or hurdle faced by fellow Vermonters? If you have a desire to understand the root causes of a problem, leverage the expertise of your education community, and create a sustainable solution, then the STEAM Challenge is for you! Vermont public secondary schools, including CTE centers, are invited to organize interdisciplinary teams of at least five students and one licensed educator to address a problem within the state. Teams are encouraged to consider including community members or organizations, such as makerspaces.

A problem is a situation your students want to change, a risk they want to reduce, or an opportunity to seize. Common types of problems include:

- Ambiguous - A problem that is wide open with a universe of possible solutions
- Constrained – A problem that is heavily constrained with few available options
- Decision Making – Problems that require choices between strategies or options
- Improvement – Changing things incrementally to improve and optimize them
- Political – Situations that involve cooperation or competition between organizations, teams, informal social structures, and individuals
- Reinvention – A problem that calls for completely replacing things with something new
- Technical – Problems that aren't social in nature such as fixing a machine
- Workaround – Attempting to get things working again as soon as possible without addressing the causes of a problem; the focus is on getting things working again

Once your team has identified a problem to solve, they must utilize a STEAM approach to come up with a solution. The team must specifically demonstrate that they applied and integrated the knowledge, skills, and practices of science, technology, engineering, arts, and mathematics and provide a plan for how they would present their solution to the public. There may be an opportunity for student projects to be on display and presented to community members. (See Appendix A for the specific STEAM approach chart later in this application.)

The STEAM Challenge will include students completing a written challenge/solution template (to be provided to winning applicants) and creation of a digital product (video, podcast, etc.) or art project (poster, display, etc.) that explains your problem, your STEAM problem-solving process, and solution. The team's work should also demonstrate how students understood and applied an entrepreneurial approach to the problem. Entrepreneurship is characterized by the taking of risks in the hope of making gains against the identified problem.

Grant Purpose and Details

The intent of this grant is to:

- Promote rigorous, relevant, and authentic STEAM learning experiences that encourage students to apply STEAM concepts to real-world situations.
- Identify thematic and interdisciplinary approaches that can serve as a model for authentic STEAM education.
- Enable participating students to demonstrate entrepreneurial skills in identifying and offering a solution to a real-world challenge.

Grant funds may be used for:

- Student enrichment activities that may include travel to gain a better understanding of the problem and build knowledge and skills in the area targeted for a solution.
- Professional learning for licensed educators working with the interdisciplinary student team to develop knowledge and skills for STEAM education.
- Tools, supplies, technology, services, and/or consulting needed to create the model or another demonstration element of the STEAM Challenge.
- STEAM curriculum, including STEM curriculum with art-infused elements. (Curriculum possibilities will be discussed at the recommended January 10 grant overview webinar.)
- Fund requests may be for less than $25,000 but may not exceed this amount. It is anticipated that most requests will be for $15,000 or less. Funds must be completely expended within the challenge window starting at grant execution through June 30, 2023. The AOE application review team may elect to award less funds than requested if deemed that the project could be accomplished with fewer resources.

Eligibility & Requirements:

This grant opportunity is open to all Vermont supervisory unions/school districts and the public secondary schools and the Career Technical Education centers they operate. School teams may include students from district elementary schools, but the team must primarily be comprised of secondary level students. Applicants are encouraged to attend a pre-grant application webinar on January 10 for a briefing on a proposed STEAM framework that will guide the creation of grant proposals.

- Applicants must identify the type of problem to be addressed (see above).
- Applicants must identify how they will utilize a STEAM approach to solving the problem drawing from the areas of science, technology, engineering, arts, and mathematics. (Appendix A)
- Applicants must demonstrate that they can complete the STEAM Challenge project itself by June 1, 2023. This will allow teams time to prepare for a public showcase of team-work before the end of the school term or June 30, 2023.

- Applicants must complete and submit the STEAM Challenge budget spreadsheet to indicate how they anticipate spending the funds. (Appendix E)
- Selected grant recipients must have student teams of no fewer than five students and be willing to have their students present to the AOE STEAM team or at another public event.
- Selected grant recipients must complete a STEAM Challenge evaluation at the conclusion of the project to assist in the creation of future STEAM Challenges. (Evaluation template will be provided.)
- The licensed educator leading the interdisciplinary student team must be willing to provide comments and other evaluations of a proposed AOE STEAM framework.

Project Award and Timeline

The grant period is projected to begin February 10, 2023 (or upon execution of the grant agreements) and expire on June 30, 2023, with the expectation that program objectives are met and all reporting and monitoring requirements are successfully fulfilled. The grantee is expected to provide a proposal, timeline, and budget request for the identified grant activity period.

Important Dates

Application Opens: December 19, 2022
Applicant Webinar: January 10, 2023 (3:30 PM)
Application Due: January 20, 2023 (4:30 PM)
Awards Announced: February 3, 2023
Anticipated Grant Duration: From date of executed grant agreement to June 30, 2023
Award amounts: No more than $25,000
Number of Awards: Number of awards will be determined by the number of applications received and the available funding.

Application Requirements

The narrative sections of the application must be double-spaced, and the font must not be smaller than 12-point and **shall not exceed 10 pages**. **Please adhere to the following sequence and format described below. Any pages beyond the 10-page limit will be excluded from review**. This page limit does not include the proposal cover page or the budget spreadsheet.

A. Adherence to Format (10 Points)

B. Proposal Description (55 Points):

1) **Problem Statement**: Identify the type of problem your student team will tackle. (Select from the list provided in the ***Challenge*** section above) Describe the problem and why your student team selected it. Be concise.

2) **Student Participation:** List the number of students anticipated for the team, the students' grades, and schools.

3) **Project Goals, Plan, Timeline, and Benchmarks:** Describe how your team will meet and conduct work for the challenge. This scope and sequence must be developed for the period between execution of the grant agreement and June 30, 2023.

- Provide a concise description of goals;
- number of participants and students to be served; and
- an achievable plan and timeline, and monthly project benchmarks.

Note: At the conclusion of the challenge, the student team must submit to AOE a completed short written challenge/solution template (to be provided) and accompanying digital or art project that explains the problem, their STEAM problem-solving process and the solution outcome. This should be reflected in the project plan and timeline.

4) **STEAM Strategy and Solution:** Provide a detailed description of how your team will utilize a STEAM approach to come up with a solution. The chart in Appendix A is meant to assist you in demonstrating the STEAM content areas that will be applied in pursuing an integration of knowledge and skills from these areas to test your solution. It is recommended that you include this completed table in your application.

C. Capacity for Success (20 Points):

The bulleted items will be considered by reviewers when they score this section of the application.

- **Staffing:** Is there an endorsed educator available to lead the challenge project?
- **Students:** Are there no fewer than five students or more participating in the challenge project, the majority from the secondary level?
- **Enrichment:** Is any professional development planned for adult leaders and students to expand their knowledge and skills in STEAM or in understanding the problem/solution itself?
- **Achievement:** Is the team structure and project plan practicable and sufficient to support the proposed project?
- **Budget:** Is the proposed budget realistic and adequately documented? Does the applicant have the resources in place to be successful? See example spreadsheet in Appendix E. Applicants may request less than $25,000 but may not exceed that amount.

D. Evaluation (15 Points):

Describe how you will define and evaluate student success and challenge achievement, even if your ultimate solution is unsuccessful in solving your identified problem.

Submission and Review Process:

Applicants must submit an original copy signed by an authorized institutional official to Lisa Bresler via email (lisa.bresler@vermont.gov) at the Vermont Agency of Education. Electronic signatures will be accepted. To be considered for funding, signed applications must be received by the Vermont Agency of Education to Lisa Bresler by 4:30 p.m. on January 20, 2023.

Submission Process Details:

1. Your application should be received by close of business (4:30 p.m.) on January 20, 2023.
2. You may send it in .docx, .doc, .pdf or other word processing formats. Please do **not** send a link to a Google document.
3. Send completed applications with cover page to Lisa Bresler at lisa.bresler@vermont.gov with Subject Line "***STEAM Challenge Submission 2023.***"
4. You will receive a confirmation upon receipt of your application. If you do NOT receive a confirmation within 24 hours, please call Lisa Bresler directly at (802) 828-0119.
5. The AOE will convert the completed cover page in Appendix D of this application into a DocuSign document which will then be routed to the current superintendent for signature to be maintained on file. Signatures indicate understanding and approval of the award application submission.

Selection Process:

All proposals will be read and scored by a small review panel of internal AOE personnel. The rubric that will be used is listed in Appendix C of this application. Common high scores will be chosen through a reviewer consensus model. AOE reserves the right to decline to select any award winners should all proposals fall short of the basic requirements for the award.

Appendix A

STEAM Approach Chart

STEAM CONTENT AREA	DESCRIPTION OF HOW KNOWLEDGE AND/OR SKILLS FROM THIS AREA WILL BE USED IN YOUR SOLUTION
Science	
Technology	
Engineering	
Arts	
Mathematics	
Entrepreneurship	**DESCRIPTION OF HOW STUDENTS UNDERSTOOD & APPLIED AN ENTREPRENEURIAL APPROACH TO THE PROBLEM**

Note: Applicants should produce a table similar to the one above in their application using as much space as needed to address each content area and also explain how students make the connection between their work and being entrepreneurial. This table is a part of the proposal description.

APPENDIX B

What is STEAM?

The AOE defines STEAM as:

> *An authentic, student-centered learning experience that targets the application and integration of the knowledge, skills, and practices of science, technology, engineering, arts, and math.*

This definition includes both concept- and content-related elements of STEAM learning. STEAM learning is representative and inclusive of real-world experiences. The application and integration of knowledge and skills across science, technology, engineering, arts, and mathematics (STEAM) education equip students with the tools to navigate the 21st-century workforce by preparing them to solve problems, make sense of information, and gather and evaluate evidence to make informed decisions. The STEAM disciplines are similar in that each involves multiple creative processes and integrative methods for inquiry and investigation. These processes and methods for creative problem-solving and inquiry will better prepare students to become innovators for future careers. The following provides STEAM Challenge team leaders with examples of STEAM learning.

Learning Links

These are connections to other disciplines that allow students to see how some skills, knowledge, or language from school subjects can fit into each other. In the visual arts, students might be challenged to create a drawing of a building using linear perspective. This strategy involves understanding the illusion of depth via linear perspective, basic measuring skills, geometric principles (e.g., parallel lines), and transformation of dilation. The math and art knowledge and skill are linked in this challenge. Students can learn about the basic math skills needed for this challenge independently from the linear perspective skills needed for this challenge. Exploration of these two sets of skills do not necessarily cross over, and one discipline skill serves as a prerequisite to the other discipline skill (e.g., students should know how to measure and understand parallel lines before learning linear perspective).

Thematic Learning

Thematic learning, which could also be considered multidisciplinary integration, includes opportunities for students to investigate broad concepts that exist and mean the same thing in multiple disciplines. This can include cognitive processes or universal concepts. For example, students might be challenged to communicate how and why local environments change over time. This can be explored through the lens of a scientist in addition to the lens of an artist. The product or activity related to the challenge can be vastly different while exploring the same idea.

Consider how bridge building can incorporate principles from geometry (e.g., a triangle as a rigid structure) or algebraic principles with suspension bridges and the properties of parabolas and quadratic functions. The exploration of these concepts does not necessarily "crossover"

into the arts and science throughout the learning process without intentionally designing the lesson to support integration and transfer.

Interdisciplinary

Interdisciplinary learning (or cross-disciplinary) includes opportunities to simultaneously investigate knowledge and skill across disciplines. Key knowledge learned and explored in interdisciplinary learning should be symbiotic; several subject areas should be evident in final products from interdisciplinary learning. For example, students could design a sustainable home for anywhere in the world using culturally specific architectural elements and relevant sustainable technology for that area. Students would need to apply knowledge and skills from the humanities, geography, and the sciences to be successful with their home design. This level of integration, along with multidisciplinary learning, are the most common.

Transdisciplinary

Transdisciplinary learning transcends learning that happens in traditional school subjects and settings. Learning in this degree is directly applied to a real-world context. The products of these units have lasting effects on the community (e.g., an invention that solves a problem, a campaign that aims to engender social change, etc.) and students engage in the same inquiry processes as one who works professionally in a similar field of study (e.g., interviewing community members, collecting raw data, etc.). Transdisciplinary learning experiences challenge conventional instructional processes by re-structuring the learning space (i.e., taking it beyond the classroom) and making the design bidirectional (i.e., students and teachers work together in the development and implementation of the lesson). Students and teachers design transdisciplinary learning together and work simultaneously to become experts in the subject. These experiences can be viewed as a collaborative learning experience for teachers, students, field experts, and the community.

Incorporating an Entrepreneurial Approach to Learning

Tomorrow's trends and great ideas are often created by kids and young adults. Some Vermont middle and high schools have begun incorporating elements of entrepreneurial activities, but likely won't ever be able to offer a comprehensive curriculum under the current structure of education discipline silos. However, STEAM education, a multi-disciplinary approach is a key component to a thriving entrepreneurial ecosystem that helps inventors and aspiring business minds succeed in developing new ideas and bring those ideas to market. STEAM education in public education is the basis for building a maker mindset and the 'on ramp' for innovation driven entrepreneurship. Entrepreneurship is the "what we will do with our creation/ solution" aspect of STEAM. Grant applicants are asked to describe how the entrepreneurial process of developing and integrating new ideas to a workable solution were addressed in the team's approach to this challenge.

Appendix C

Scoring Rubric: STEAM Challenge Winter 2022

Guiding Questions	Poor	Average	Excellent
Format - (10 Points) • *Does the application adhere to the application formatting requirements?* • *Does the application include all elements required in sufficient length and detail?*	0 – 3	4 – 7	8 – 10
Proposal Description - (55 Points) • *Is a specific type of problem identified? Is the problem adequately explained & the reasons for the student interest in solving this problem?* • *Are participating students appropriately identified? Did the applicant provide a description of how the team will meet to address the challenge?* • *Did the applicant address how they will utilize an integrated STEAM approach & included the appropriate completed table?* • *Is the proposed challenge approach innovative, promote learning, create new opportunities for student engagement?*	0 – 17	18 – 35	36 – 50
Capacity for Success - (20 Points) • *Is there an endorsed educator involved & no fewer than five students participating in the challenge?* • *Can the work be completed in a quality manner within the meeting approach proposed by the applicant?* • *Is the proposed budget adequate? Are the resources in place to be successful?* • *Is any professional development proposed for adults/students?*	0 – 8	9 – 15	16 – 25
Evaluation - (15 Points) • *Are there evaluation components inherent in the project—are outcomes based in a measurable way?* • *Is there any evaluation of how the student team integrated STEAM knowledge & skills in their challenge approach?* • *Are there clear measures of success identified?* • *Does the applicant describe how they will present their Challenge process and outcomes?*	0 – 5	6 – 10	11 – 15
* TOTAL SCORE (MAX IS 100)			

* Though reviewers may score in this manner, close or common scores will be determined by consensus by the review group.

APPENDIX D

Proposal Cover Page: STEAM Challenge Winter 2022

School District & SU	
Contact Person	
Business Manager	
Phone	
E-mail	
Superintendent Name	
Superintendent Email	
	Provide detail about the school as follows:
School	
Grade Spans	
Current Enrollment	

Superintendent Signature:

_____ _____

(this signature will be obtained through AOE's DocuSign E-signature process via ADS E-Signature)

Date

APPENDIX E

SAMPLE SPREADSHEET

Create your budget as shown in the example below. Include relevant items as you see fit. Specific items listed below are provided as an example only. Function and object codes not included in this example may be used by applicants but must adhere to AOE budgeting requirements. Consult your business office personnel if you have questions about appropriate function and object codes to use. Note that curriculum with a per unit cost of $5,000 or more uses object code 700, if less than $5,000 use object code 600.

STEAM CHALLENGE GRANT WINTER 2022

School	Contact Person	Email	Phone

	Object Codes								
Function Code	**(100) Stipends**	**(200) Benefits**	**(300) Professional & Technical Services**	**(500) Other Purchased Services**	**(600) Supplies**	**(600) Supplies-Technology Related Hardware/Software**	**(700) Equipment**	**(800) Sub-grants, dues & fees**	**TOTAL**
1000 - Instruction	Stipends for staff work ouside of regular teaching role.				All classroom supplies needed for team to create a working model.				$1,500
2212 - Instruction & Curriculum Development							STEAM curriculum, including activities guide.		$5,000
2213 - Instructional Staff Development & Training			In-service training.						$1,500
2230 - Instruction - Related Technology						ABC Corp. kit of electronic building materials for workable switch.			$2,000
2495 - Administration for Grants									
2715 - Field Trips				Transportation to factory.				Entrance fees to the ABC factory.	$1,000
2716 - Extra/Co-Curricular Transportation									
TOTAL OF ALL REQUESTS									$11,000