STEAM Education Program Description

STΣ@M: Science & Technology, interpreted through Engineering & the Arts, all based in Mathematical elements.

A framework for teaching that is based on natural ways of learning, customizable for ALL types of students and programs and is FUNctional!

Students learn to organize with math, while they research as scientists and historians by using technology, so that they can understand global development and communicate about what is needed, wanted and possible in engineering for universal sustainability.

STEAM Framework Definition: Science and Technology are understood as the basis of what the world has to go forward with, to be analyzed and developed through Engineering and the Arts, with the knowledge that everything is based in elements of Mathematics.

It is a contextual curriculum where the subjects are coordinated to support each other under a formal educational structure of how science, technology, engineering, mathematics and the broad spectrum of the arts all relate to each another in reality. This framework not only includes the art of aesthetics and design, but also the divisions of the liberal, language, musical, physical and manual arts.

The STEAM structure explains how all the divisions of education and life work together; therefore it offers a formal place in the STEM structure for the Language Arts, Social Studies, and the purposeful integration of the exploratory subjects including the Arts, Music, CTE and Physical Education divisions of public education.

It has been implemented in PK-12, college classes, museums, after-school programs and with rehabilitation and dementia patients. STEAM Education has a framework for lesson plans that show how it is adaptable, benchmarked and easily reinforces the standards in unique and engaging ways.

STEAM ties ALL the subjects to each other in an interdisciplinary way as well as to the full spectrum of the rapidly changing business and professional world. It is a life-long career and life-readiness way of educating and learning that is adaptable to the rapidly changing global world we live in.

Shifting to a STEAM perspective means understanding learning contextually; not only in terms of having a framework that illustrates where the subjects overlap, but also in providing a living and adaptable learning structure for ever-changing personal and unpredictable global development.

S-T-E-M with the A includes
• Sharing knowledge with communication and language arts, "voice" – impact, power, legacy
• A working knowledge of manual and physical arts, including how-to and fitness
• Better understanding past and present cultures and aesthetics through the fine arts
• Rhythmic and emotional use of math, physics, physiology and often language with the musical arts
• Understanding sociological developments, human nature, and ethics with the liberal arts

Programs

STEAM is being used in schools all around the world to teach academic and life skills in a standards-backed, reality-based, personally relevant exploratory learning environment. It is adaptable, benchmarked, cross-curricular alignment for multi-disciplinary student assessments, and reinforces NCLB and state standards and has been used with teachers required to integrate with the Common Core, all done in unique and engaging ways. It is backed with a variety of well-recognized and adopted educational philosophies, classroom management and assessment strategies. It promotes deeper understanding and transference of knowledge across the subjects. It is used for developing model educational programs to create functionally literate people by increasing the depth and breadth of proficiency in all students and educators and the communities they influence. It works by expanding a program's current lesson plans into STEAM plans for more realistic discovery and innovation for all types of learners and support from and interaction with local and global community.

STEAM can help make good education better. The STEAM framework, like steam itself, can fit anywhere and take innumerable shapes, and, if used purposefully, can be a very powerful and enjoyable tool for teaching and learning any level of any topic. It delivers high quality team-based education to all students. Preparing children for a growing variety of careers is important to advance the global society and its economies. Careers past, current and potential are organized to be taught with STEAM. Students are taught to evaluate needs, wants and opportunities in order to be informed users, responders and innovators. It prepares students to be life-long learners in pursuit of college, skilled trade programs, potential yet unknown career paths and well-balanced lives. STEAM is a whole-learner, community-involved and influenced learning environment. It has a living-curriculum structure that is representative of the surrounding culture and aware and tolerant of all types of diversity and perspectives.

Classrooms

Embedded in the framework is a system to establish well-balanced teams among educators and students based on a variety of characteristics. All participants have ways they are advanced and are challenged. With this system, their skills are used for leading in some areas while other areas are strengthened through observing and assisting. Educators instruct within their specialty with co-planned thematic units that everyone contributes to in projects related to the required benchmark concepts and skills. There are times when various groups of educators co-teach overlapping subject areas and assignments. However, most of the time, educators still are able to work focused on their own schedule and tie to the theme when it is convenient in their plans. Special times are designated for working on projects, so that as new concepts are learned they can be applied and built upon. The classrooms and common areas become a network of specialty topics in a living and growing discovery place.

Educators

STEAM Educators report feeling rejuvenated by richer living work environments. They have the ability to use more diversification of teaching methods and be more of a facilitator to learners. It empowers educators to meet the guidelines in a variety of unique and engaging ways and to meaningfully cross-reference concepts and vocabulary. They have the opportunity to teach collaboratively, exchange ideas, have easier preparations for substitutes and have more productive common planning times. The teachers report feeling the positive shift from ME to WE in the staff as well as with students.

They state that through the structure of rubric-based portfolios and process work, they have a better (broader and deeper) understanding of what their students prove they know in different ways including what they can tangibly accomplish. Educators can better match their learning objectives and goals to the

variety of learners they encounter. They can cater the themes to those of interest to the local students and community.

Students
STEAM asks students to evaluate local to global career, hobby and life opportunities and developments in historical, current and potential contexts. Students are challenged to learn and apply the breadth and depth of content and skill sets across the disciplines through reality-based projects using up-to-date research from the fields. Students are asked to perpetually evaluate their points of interest, experiences and talents with ongoing portfolio development, which becomes useful for applying to extra-curricular and post-graduation pursuits.

STEAM educators have reported to us that, when students are introduced to the framework and shown how to create academically and socially balanced teams and are tasked with working on reality-based thematic concepts, the following things have been noticed:

- Students soon start using knowledge and skills from across the subjects to back up their work and have deeper understanding and recall of concepts when reminded of related activities.

- Students develop an ability to recognize and respect their own and others' varying skill sets and intelligences. They learn how to best fit into teams based on roles that they have a predisposition to do well at, and learn how they and others create society.

- They more naturally use team dynamics help solve conflicts and conversations are reported as being more on-topic.

- Students look forward to these activities and take more measures to prepare for missing work during these times. When the projects align well with the curricular concepts of that time frame, then the students have more of a direct reason to learn the content for optimal application in their project.

- Participants feel more group identity and pride with fellow students and the school, something that is often under-cultivated. They feel a shift from ME (the singular student) to WE (an active participant in the global community.)

- Classroom and SPED teachers report that students with IEPs and 504s are more engaged. Special, ESL and advanced learners get more of what they need academically and interactively from the team-based approach and need fewer specialized pull-out sessions.

Communities
STEAM promotes a structure of community and business partnerships with schools. Programs that are well-supported by their communities have a record of higher engagement among educators and all levels and types of students and families for better overall program sustainability. Our plans promote adding in ecological and cultural sustainability, too, including having rotating displays in the common areas of the schools and having community meetings and program information nights. Educators report parent engagement and donations are increasing.

Themes Commonly Used

STEAM Education is how ALL subjects and people are recognized and can contribute. All effort is encouraged. It is hoped to be a factor in diminishing the drop-out, unemployment and poverty rates, having to teach to the test instead of the individual, and the disproportionate percentage of women and minorities in leadership positions.

Many programs choose to revolve their STEAM curriculum framework around themes such as:
- Power & Energy
- Elements & Processes
- Life & Movement
- Transportation
- Communication
- Music
- Inventions

It is necessary to have many varied experiences for students to be successful in this rapidly developing technological world, but it can still be done inexpensively.

Courses Offered

WHAT'S YOUR POINT? - The first example MS/HS Introductory STEAM Course with a sample portfolio

Students start at the point of the pyramid, based on their perspective as a person who learns holistically. The course teaches them to evaluate their skills and interests within a structure for investigating the educational discipline fields to learn more about the breadth and depth of career, hobby and life options. It exposes students to a large range of skill sets and career choices through projects that include research and development. Students perpetually evaluate their points of interest, experiences and talents with ongoing portfolio development that become useful for applying to extracurricular and post-graduation pursuits. Students evaluate local to global career path opportunities and developments in historical, current and potential contexts, and investigate a spectrum of careers and the related discipline skills needed to pursue them.

STEAM Education Certification Packages

We provide professional development for individuals and educational programs to assist and support the transition to a STEAM platform. We offer three types of training packages- one for individual **Educators**, one for **Staff**, and one for whole **Program**s. The focus of these professional development sessions are to learn about Integrated Science-Technology-Engineering-Arts & Math Education: why it's being done, how it works, how it affects you, your school, your community. These sessions are geared for school administrators and educator and are appropriate for museum affiliates and out-of-school program facilitators.

What is covered in a STEAM training?

Learn about Integrated Science-Technology-Engineering-Arts & Math Education: why it's being done, how it works, how it affects you, your school and your community.

STEAM Training includes 24 video segments totaling about 7 1/2 hours training with supporting documents which covers theory, program and classroom establishment instructions and help writing custom STEAM lesson briefs. Training results in being prepared to write and submit a vetted STEAM Lesson Brief to become a STEAM Certified Educator. Certification requires about another 4 hours for completing a lesson plan and the process, less if training with a team.

Both STEAM Trained and Certified educators will have access to the training and teaching documents, as well as the live bank of STEAM lesson plans for a year after their training, including updates made and new documents added during that time.

Staff Educator Training and Certification

Our Staff Educator Certification offers a full teaching staff an introduction to STEAM and allows them to take it in their own direction. The training includes an introduction to STEAM theory, program and classroom establishment, as well as help in creating personalized STEAM lesson plans and student portfolios. All staff members will receive online accounts to complete their video supported virtual training based on the membership level purchased by the Program. Our Tier 4 Membership level allows educators to become trained in STEAM theory, development and practicum through our full set of training videos (about 7 1/2 hours total runtime) plus transcripts, program documents, and one-year access to our STEAM Lesson Plan Bank. Tier 5 Membership includes additional help writing custom STEAM lesson briefs which result in having a STEAM Certified Staff.

General Educator Training includes:

- Virtual Training - Theory and Reasoning
  - Introduction to the STEAM framework
  - Review of epistemology and pedagogy of STEM/STEAM
  - Learn about the commons of the subjects
  - Class management tactics –behavioral & interdisciplinary
  - Meeting extensions for all types of learners
  - Review of previous examples of STEAM projects and programs
  - Developing Curriculum Maps
- Virtual Training - Practicum & Plan Creation – **Personalized for Optional On-Site Training**
  - Reasoning for and how to create STEAM Teams for educators and students
  - Examples of STEAM themes& interdisciplinary PBL projects –hands-on
  - Program sustainability considerations and tactics
  - Partnerships, sponsorships and grants advice
  - Community Outreach structure and STEAM school events
  - Lesson plan creation/expansion based on benchmarks

What are STEAM Educator Certification Training Camps for Individuals?

We offer **Certification Educator Camps** where an administrator , curriculum coordinator, informal educator or teacher can come to learn to use the STEAM framework and to see if the program is a good fit for their whole program's needs. This is a Virtual & On-Site Hybrid Training. Administrators and individuals or small groups of teachers, museum curators, camp directors and home-schoolers are the primary attendees at these camps. We offer these STEAM Training Camps throughout the year and try to rotate the locations around larger cities in the different regions of the continental U.S. You can check our **Store Page** for upcoming camps. If you'd like to receive our new camp announcements and other STEAM news, you may sign up for our newsletter on our homepage.

What is the difference between being STEAM trained and STEAM certified?
Educators who attended a full STEAM training may state that they are STEAM trained on how to deliver and teach with STEAM lesson plans and practices. Educators who have completed a lesson plan and been certified may state that they are STEAM certified and have proven that they know how to write a STEAM lesson plan. Educators with STEAM certification and experience are becoming sought after in the global market. Both STEAM Trained and Certified staff will have access to the training and teaching documents as well as the live bank of STEAM lesson plans for a year after their training, including updates made and new documents added during that time.

What are some more details on certified STEAM lesson plans?
There is a growing bank of STEAM lesson plans that are contributed by teachers with a similar philosophy – integrating meaningful reality-based STEAM education. The first sets of teachers in the network helped to frame the lesson plan template and, as things develop in the educational world, the template is adaptable to accommodate shifts. The lesson plan template is a device for educators to have a structure that helps coordinate ideas across the spectrum of subjects and is adaptable for all educational levels. Once the lesson plans are inclusive across the subject areas for a specific educational level and are certified, they are uploaded and offered to the network.

The point of having educators write STEAM lesson plans to contribute to a commons is two-fold: the first is to verify that they understand how to build a STEAM lesson plan after the training and to receive suggestions on how to make them more well-rounded and polished, the second is to give voice to the educational experts, the teachers in the field, to create a standards-based, live curriculum better than any individual educational program or company can alone. By having STEAM certified teachers contribute at least one lesson plan to the commons, the plans become searchable by the network and everyone is submitting work that can be used, tweaked, updated and supported by similarly minded teachers around the world. With the rate of people now contributing, it is hoped that soon educators can pick and choose variations of lessons to build a full personalized curriculum that works for their students.

In order to maintain the structure that supports impassioned educators to collaborate freely and without biases towards funders, we have to charge to have access to and be a part of the network that shares ideas and lesson plans.

Most states offer professional development points for educational publications, so educators would have the added benefit of being able to apply for additional PD points for any approved lesson plans that they submit.

Program Certification

We offer a transition support Program Certification to implement the paradigm shift to become a STEAM school as a supplement to a STEAM certified staff. It generally takes 3-5 years to transition a school program to fully adopt and use a new paradigm. The first year of a school's transition is key to building the foundation and some schools prefer more support during that time. We now offer a fully virtual Program Certification package. However, most of our programs have traditionally chosen to bring the STEAM Education staff on-site for the benefit of customized professional development, as well as curricular help and support. While we highly recommend on-site visits, they are no longer required for Program Certification. The virtual Program Certification package is available for programs who are unable to accommodate on-site visits and instead requires the Program to provide photos and videos of the program as well as potentially schedule Skype time with the STEAM Education staff for support during first-year implementation.

90% of school staff must be certified as a pre-qualifier to the Program Certification completion, including at least one administrator, one guidance officer, all extension teachers and 90% of the professional staff in each site program. If necessary, additional staff training can be accomplished by having individuals receive the training at a STEAM training camp or through the on-line training site.

Details on international STEAM training

All domestically offered services are available for international requests including Staff Training, Program Certification, Keynotes & Presentations and Consulting. Please go to our 'Certifications & Trainings' page for a link to our international programs document. The most economical way to receive training is to sign up for the membership that includes the video training. This training is currently offered in English; please contact us to give us feedback on what other languages would be most useful to have a translation in.

Fees

Consulting for schools and institutions is contracted on an individual basis. Please contact us at bookings@steamedu.com for a complete list of current programs and pricing. Many schools are getting sponsorships using grants, Title I funds or local businesses to reduce their direct costs.

Does our school need special equipment to get started with STEAM?

It can be quite helpful to have a STEAM lab with work tables and open spaces that classes can use for constructing things, but it is not necessary. As STEAM labs are unique to each school, we offer help in designing them. No special space or equipment is required to be a STEAM school, but highly recommended are: a STEAM room for building things, a grade level appropriate technology education shop/lab and a clean room for robotics equipment, some garden beds and greenhouses with a hydroponics lab, and a 3D printer. If the district is capable of offering electronics to students, we suggest laptops, not tablets and iPads. Laptops provide the ability for students to go much deeper with their studies. We do hope that programs are able to at least offer a 1:4 ratio of laptops for their students.

What do the additional program certification PD visits look like?
From the contract: Professional development visits to assist administration and staff in implementation, deeper learning about STEAM, program support and individual meetings with staff members are available upon request. This may include scheduled time for Consultant's observations in each building and to have time to talk with teachers during their planning periods and the entire staff after school.

In reality: A personal visit can be made to spend time in each school walking through halls, doing quick observations of classes and looking at examples of STEAM projects that are being worked on. There may be brief meetings with staff during their planning times to address issues at their grade levels. After school in the group meeting, we can provide a recap and talk about program updates that have happened since your school's training and will address general concerns and questions from the teachers. These visits are meant to be supportive, not critical. We are not there to look at what isn't being done, but what is, and to offer help to grow the program. It takes time to meet the requirements of the program and we want the teachers to feel that we're there to help them, answer questions, learn from their experiences and work out issues together by brainstorming as experts together. They know their students and your structure and have their favorite programs and lessons. We'd like to know what is working, what needs support, and what is not clear. We'll offer help pulling together the strengths from your team and offering suggestions from what we see other teams doing to extend on what your team is doing.

Program Certification Portfolio creation and approval process: During the summer break at the end of the school year, the portfolio will be finalized by July 1st to complete the program certification process by August 15th.

Program Certification
- Portfolio requirement completion = certificate of Program Certification for completing the requirements in that year - can get annual update certifications.

*Programs meeting certification requirements are eligible for PD update and renewal package for each subsequent continuous year at a reduced price from Year One. This primarily involves updating and submitting an annual portfolio and the option of requesting an on-site PD update.

A STEAM Coordinator is suggested for school and/or district wide programs.