STEAM Education Program Description

ST∑@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!

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 co-support each other under a formal educational structure of how science, technology, engineering, mathematics and the broad spectrum of the arts, all relate to one another in reality. This framework, not only includes the art of aesthetics and design, but also the art divisions of the liberal, language, musical, physical and manual. 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. 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 the past and present cultures and aesthetics through the fine arts,
• rhythmic and emotional use of math with the musical arts,
• understanding sociological developments, human nature and ethics with the liberal arts…

Programs:
STEAM is proving successful in schools all around the world to better teach academic and life skills in a standards-backed, realistic-based, personally relevant exploratory learning environment. It is adaptable, strong, benchmarked, measurable, and reinforces NCLB and state standards and integrates with the Common Core in unique and engaging ways. It is backed with the major 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.

STEAM can help make good education better. The STEAM framework, like steam itself, can fit anywhere and take innumerable shapes, and if used purposely 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 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 & innovators. It prepares students to be life-long learners in pursuit of college, skilled trade programs, potentially yet unknown career paths and well-balanced lives.
STEAM is a whole-learner, community-involved and influenced learning environment. It has living-curriculum structure that is representative of the surrounding culture and aware and tolerant of all types of diversity, perspectives and changes.

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 a 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. 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.

Students: All learners further investigate and coordinate topics and tangents, learn and teach others for more perspectives in discussions and on projects. This results in an impressive variety of viable solutions and extensions to authentic problems. They soon start using knowledge and skills from across the subjects to back up their discussions and have deeper understanding and recall of concepts when reminded of related activities. Students develop an ability to recognize and respect their own and other’s 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 how they and others create society. They more naturally know how to use team dynamics help solve conflicts and side 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.

Classroom and SPED teachers report that students with IEP’s and 504’s 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. Participants feel 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.)

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 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. They report more personal and student engagement with student self-direction for project-based, discovery learning. 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.

STEAM teaches students by way of reality-based authentic units to synthesize, how to inter-relate, build systems, process acquired facts, and question information by manipulating & observing data in more complex situations. … Teachers can work together to provide in depth coverage of their areas of expertise while reinforcing what students are learning in other specific fields - Dr. Cameron – STEAM Principal UPES
Communities: STEAM promotes a structure of community and business partnerships with schools and has a record of higher engagement among educators, all levels and types of students and families for both program and ecological sustainability. STEAM programs rotate displays in the common areas of the schools and have community meetings and program information nights. Educators report parent engagement and donations are increasing.

Quotes: “STEM skills are critical for every student, but the creativity portion must also be adopted to produce an innovative workforce… STEAM teaches students by way of reality-based authentic units to synthesize, how to inter-relate, build systems, process acquired facts, and question information by manipulating & observing data in more complex situations. … Teachers can work together to provide in-depth coverage of their areas of expertise while reinforcing what students are learning in other specific fields… The current curriculum does not have to change. Educators can control STEAM and build on it as needed. STEAM provides a common thread throughout all subjects. By teaching across all fields, the transference of knowledge is directly supported and blended unilaterally. There are no special labs needed. STEAM was created with special education and gifted students in mind. STEAM correlates with Common Core Standards of Mathematics by making conjectures about meaning, ability to probe, construct viable arguments, utilize hands-on modeling, and express ideas verbally and in written form. STEAM is gifted education throughout the curriculum and all classes.” – Dr. Cameron – STEAM Principal UPES

“STEAM is enhancing our school culture. We are seeing innovative engagement on both the part of our teachers and students. Georgette provides a highly engaging training where teachers are encouraged and supported to reflect and collaborate. Georgette is to staff development what The Beatles are to music. – Dr. Gaillard – STEAM Principal WMS

Themes: STEAM Education is how ALL subjects and peoples are recognized, can contribute and 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.

WHAT’S YOUR POINT! – A brief explanation of the MS/HS introductory STEAM course
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 extra-curricular and post-graduation pursuits. Students evaluate local to global career path opportunities and developments in historical, current & potential contexts and investigate a spectrum of careers and the related discipline skills needed to pursue them.
**STEAM Education Timeline**

2006 - STEAM Education was developed by Georgette Yakman while a master’s student in Technology Education at Virginia Tech – graduated spring 2007.

2007 – STEAM Education middle school program starts in VA.
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2008 – STEAM Education high school program starts in VA.
   STEAM research first published in 2008 by PATT organization in the Netherlands

2009 – G. Yakman receives an advanced degree in Integrated STEM Education from VA Tech
   First HS STEAM Team wins national engineering competition at the Technology Student Association.

2010 – G. Yakman named Educator of the Year by the NRV Technology Council.

2011 - Minister of S. Korea initiated the adoption of STEAM framework for all K-12 schools
   G. Yakman selected by the Gates Foundation backed, annual Big Ideas Fest recognizing the most influential US educators of the year.

2012 - Two pilot public schools in the United States this year that have transformed to STEAM Education programs. Both University Place Elementary School in Tuscaloosa, AL and Wiley Middle School in Winston-Salem, NC are Title 1 schools that have had to go under restructuring. Both are reporting exciting preliminary results including more engagement, deeper learning, higher educator job satisfaction, more parent involvement and business partnerships

2013 – Many more K-12 schools and some colleges and universities, camps and museums across the US are making commitments to begin using the framework in the next two years. Many are seeking grants to make the transition. There is also interest from rehabilitative and elder-care facilities.

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STEAM Education Certification Packages

Administrator Certification – offered as day training rate for a team of administrators or as an individual participant rate for a workshop.
- 1 day – morning is a framework overview; afternoon is learning to coordinate STEM/STEAM teams of educators for best results.

Educator Certification - Pre-school, Elementary, Middle, High, Collegiate
- 2 full days minimum (bolded): 6-8 PD points per day depending on the state DOE structure
- **Day 1** - morning is a framework overview; afternoon is team structure and development, learning to use a common language to coordinate with each discipline of education
- **Day 2** – morning is working with themes based on new and existing favorite lesson plans to expand them to be STEAM curricula, afternoon is correlating curricula and learning to establish a professional structure for success with your peers, students & the community
- Day 3 – 5 options – additional certifications offered for:
  - STEAM Grade Level Specialists— for; elementary, middle school, high school, alternative and home school environments – 1 day
  - STEAM Sponsorship/Grant Coordinator: develop a plan to create & strengthen partnerships – 1 day
  - STEAM Curriculum Writers Certification – learn to be a coordinator & writing specialist– 3 days

School or Program Certification – PK-20
Pre-visit work: evaluation of current curricula, community demographics, program long-range plan and concepts for why and how they wish to move towards using a STEAM framework.

**2 days minimum on-site for Administration and Educator Certifications,**
Day 1 - Administrator Certification and Educator Introduction
- give an introduction to STEAM, research, development, reasoning
- Cover Me to We STEAM Team strategy – includes professional and student team building & classroom behavior management strategies
- meet with Administrators and curriculum coordinators, SPED, CTE
- observe and meet with staff and educators and students that afternoon, (community welcome)
- develop a specific plan over the evening for your program

Day 2 – Program Direction & Educator Certification
- meet with administrators again in the morning to discuss the best STEAM venue options for that program's purpose – build educator teams
- late-morning is working with themes & existing favorite lesson plans to expand them to be STEAM curricula
- afternoon is correlating curricula with one another and learning to establish a professional structure for success with your peers, students & the community

**3 day on or off-site specific to program development & certification needs,**
Day 3-4 – Off-Site – Custom STEM Program Integration & Sustainability Plan including local business partnership development assistance.

Day 5 – Review of developed curricula & evaluation of STEAM integration into the program.

** - if my schedule allows, can remain on-site for cost of accommodation stipend

3 days of PD towards Program Certification,
3 days of PD – each includes; STEAM program updates, framework and curricula help, and program evaluation update towards program certification

Final evaluation and Program Certification for following year. *

Program Certification
- quarterly evaluations included with requested PD,
- portfolio requirement completion = certificate of Program Certification for the following year. –

*Programs meeting certification requirements are eligible for PD update and renewal package for each subsequent continuous-year at a reduced price to year one. This primarily involves updating and submitting an annual portfolio and a minimum of one-on-site evaluation and PD update.

Program Certification Portfolio Includes:
- Demographics
- Statistics Tracking
- Certified Personnel Teams
  - 1 STEAM lesson plan per year
  - List of annual projects
- Student Team Structure
- Living Learning Environment
- Theme Displays in Common Areas
- Partnerships with Organizations and Businesses

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

Fees
- Satellite Certification Camps for individual educators and administrators. $150-$500/per person - most common = STEAM Educator Certification, $200, 12-14 PD pts/2-day
- Staff Certification: $4000 for minimal 2-day staff training *+ travel/accommodations
- School Certification: average $10,000 for year one and $3000-$6000 subsequently. Includes customized School/Educator Certification, annual PD updates & portfolio approval.*
- Special packages available for districts implementing PK-12.
- A materials package is being developed with a range of support packages and licenses.
- Many schools are getting sponsored by grants or local businesses to reduce their direct costs.

No prerequisite requirements. Licensed professional educators are eligible for professional development points.