A Criteria for Quality STEM/STEAM in San Diego

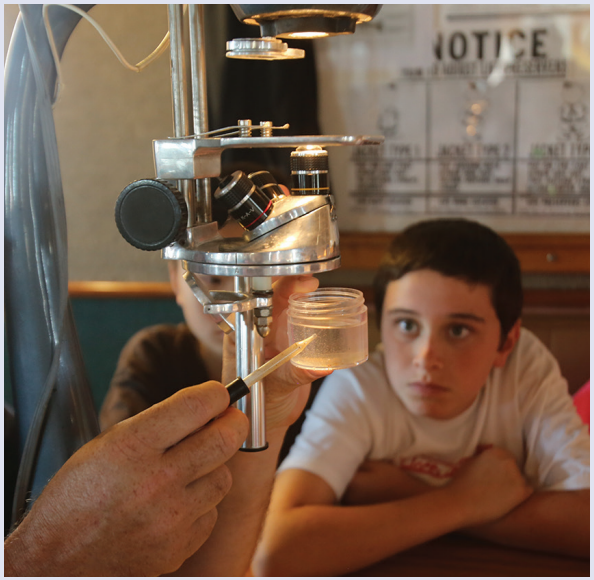
A Criteria for Quality STEM/STEAM in San Diego (SDQC) was created to support the growing number of K-12 STEM/STEAM schools and programs as they implement integrated STEM/STEAM learning experiences in all K-12 classrooms. This tool may serve as a framework to facilitate inter-segmental discussion on program quality indicators. Across the Nation, K-12 STEM/STEAM programs and schools are proliferating in response to education, policy, and business reports supporting expansion and improvements in STEM/STEAM education. School and district personnel, after school program providers, community members, business partners, parents, and STEM/STEAM professionals may find this SDQC tool useful to ultimately provide measurable program outcomes.

SAN DIEGO COUNTY OFFICE OF EDUCATION

SDSA San Diego Science Alliance

SAN DIEGO STEM Collaboratory

ARTS EMPOWER SAN DIEGO



Innovate, CDE, 2014.
Recommendation 4: Framework:

Establish a K-12 STEM framework for teaching and learning that identifies the sequence of STEM knowledge, skills, and attitudes toward developing college, career, and life readiness skills and that aligns with the CCSS, NGSS, and associated curriculum frameworks.

Innovate, CDE, 2014.
Recommendation 6: Assessment and Accountability:

Integrate STEM into assessment and accountability systems in a cohesive, meaningful, and innovative fashion, taking advantage of the entire suite of assessment tools available to, and under development by, the state and LEAs at this time.

Figure 1: Recommendations from INNOVATE: A Blueprint for Science, Technology, Engineering, and Mathematics in California Public Education

STEM Education in California

To be successful, California's efforts to improve schools and raise student achievement must include advancing our community's understanding of STEM: science, technology, engineering, and mathematics. Through STEM education, students learn to become problem solvers, innovators, creators, and collaborators. Students with these critical skills will satisfy the critical need in the education-industry pipeline for engineers, scientists, and innovators, so essential to the future of California and the Nation.

In 2014, Tom Torlakson, California Superintendent of Public Instruction, issued a report titled *INNOVATE: A Blueprint for Science, Technology, Engineering, and Mathematics in California Public Education.* This document examines the status of STEM learning in the State and provides recommendations for the future of STEM education in California. This report calls upon policy makers, business leaders, philanthropists, educators, and all Californians to take the actions necessary to realize this future vision.

> ***California leads the world in STEM education, inspiring and preparing all of its students to seize the opportunities of the global society through innovation, inquiry, collaboration, and creative problem solving.***[2]

Recommendations 4 and 6 in the *INNOVATE* report (see Figure 1) call for a K-12 STEM framework and accountability system to support the development of key STEM competencies. **A Criteria for Quality STEM/STEAM in San Diego (SDQC)** is a tool for schools and program partners to look at the big picture of integrated STEM education with an eye towards continuous improvement. It allows stakeholders to examine and reflect on how their school or program aligns with common attributes, components, and elements in an effort to provide an integrated STEM learning experience for every student.

Development Process of A Criteria for Quality STEM/STEAM in San Diego

A local San Diego STEM Quality Criteria Task Force convened November 2013 through June 2014 to address the task of researching quality criteria efforts of other states, identifying key parts of a STEM rubric, and reviewing drafts of a locally created STEM quality criteria document. This diverse group, representing San Diego County teachers of all grade spans, school principals, district administrators, PTA, university educators, engineers, informal educators, and parents was led by John Spiegel, Science Coordinator at the San Diego County Office of Education, and Nancy Taylor, of the San Diego Science Alliance. In reviewing the literature and analyzing similar efforts in other states, the task force developed a prioritized list of key attributes of quality STEM programs. The architecture of the San Diego STEM Quality Criteria Rubic (SDSTEMQC) emerged.

As the SDSTEMQC draft continued to develop it was shared, in draft form, and discussed at local and State STEM events and organizations. Ongoing collaboration with the California STEM Learning Network and the California Department of Education to advance this work and requests from colleagues throughout California indicated the need to articulate a common language for STEM programs and celebrate the development and success of programs with the use of a common tool.

In April of 2014 the SDSTEMQC was presented at an Arts + STEM Collaborative. Prompted by funding from The Boeing Company, the Arts + STEM Collaborative was established to provide arts, STEM and education leaders throughout Los Angeles, Orange and San Diego Counties the opportunity to share best practices and identify areas of convergence. Not only was it determined that self-identified STEM schools were on the rise, self-identified STEAM schools were also appearing. Representatives from both the STEM and ARTS community realized the importance of defining attributes of optimal Arts + STEM learning environments.

In August 2015, a diverse group of San Diego arts educators, arts partners, recognized STEAM community leaders and select STEM Criteria Task Force members convened to synthesize STEAM criteria into the SDSTEMQC. A smaller writing team emerged to align attributes, components and elements and review practices and capacities of standards. The result is the incorporation of the Arts in a new, more dynamic view of integrated learning for students via **A Criteria for Quality STEM/STEAM in San Diego (SDQC)**.

[1]Bybee, 2011. NGA, 2011. NRC, 2011. NRC, 2012.
[2]INNOVATE: A Blueprint for Science, Technology, Engineering and Mathematics, in California Public Education. CDE, 2014

Acknowledgements-STEM Quality Criteria Taskforce

Many individuals have given extensive time and energy through their participation in the San Diego STEM Quality Criteria Task Force. Their time, efforts, collaboration, and feedback into this process have been invaluable in the creation and refinement of this document. A list of those involved is included at the end of this document.

Appreciation is also given to colleagues around the country and in California for on-going dialogue, input, and support, including:

- Susan Bonilla, Assemblywoman
  California 11th District (Concord)
- Mary Kraus, Online and Blended Learning Specialist
  San Diego County Office of Education
- Ellen Peneski, Executive Director
  San Diego Science Alliance (SDSA)
- Chris Roe, CEO
  California STEM Learning Network (CSLNet)
- Karen Shores, Administrator
  STEM Office, Professional Learning Support Division
  California Department of Education
- John Spiegel, Science Coordinator
  San Diego County Office of Education
- Nancy Taylor
  San Diego Science Alliance (SDSA)

What is STEM?

In an attempt to capture the spirit of both the education and workforce communities, the California STEM Task Force developed the following definition and description:[3]

> ***K-12 STEM education encompasses the processes of critical thinking, analysis, and collaboration in which students integrate the processes and concepts in real world contexts of science, technology, engineering, and mathematics, fostering the development of STEM skills and competencies for college, career, and life.***

Rodger Bybee's seminal article, *Advancing STEM Education: A 2020 Vision*, clearly articulated the basis for STEM education planning, noting, "Now is the time to move beyond the slogan and make STEM literacy for all students an educational priority" (Bybee, 2010, p.31).

In keeping with Bybee's vision, several policy, government, and educational groups have worked to identify specific goals for STEM education. These include the National Research Council Committee on Highly Successful School or Programs for K-12 STEM Education, 2011; The California Space Education and Workforce Institute, 2011; The Alliance for Regional Collaborations to Heighten Educational Success, 2008; and the California STEM Learning Network, 2013. Generally, these goals have been divided into either **educational goals**, such as increasing the STEM proficiency of all students, or **workforce goals,** such as expanding the number of students entering postsecondary education and the STEM workforce. Both sets of goals are intended to enhance the global competitiveness of the U.S. economy and help Californians achieve economic security.

A number of professional organizations in STEM have developed working definitions of STEM literacy in each of their content areas, while acknowledging the integrated and interrelated nature of STEM education. The National Governors Association, College Board, Achieve, Inc., and STEM professional organizations have recommended ways to demonstrate the connections between STEM domains:

Scientifically literate students use scientific knowledge not only in physics, chemistry, biological sciences, and earth/space sciences to understand the natural world, but they also understand the scientific need for existing and new technologies, how new advances in scientific understanding can be engineered, and how mathematics is used to articulate and solve problems.

Technologically literate students understand that technology is the innovation with or manipulation of our natural resources to help create and satisfy human needs and also to learn how to obtain, utilize, and manage technological tools to solve science, mathematics, and engineering problems.

Students who are literate in engineering understand how past, present, and future technologies are developed through the engineering design process to solve problems. They also see how science and mathematics are used in the creation of these technologies.

Mathematically literate students not only know how to analyze, reason, and communicate ideas effectively; they can also mathematically pose, model, formulate, solve, and interpret questions and solutions in science, technology, and engineering.

Through problem/project-based learning situations, students weave together and communicate their understanding of STEM concepts. Concepts that were once taught in isolation become tangible and relevant to their daily lives. Integrated approaches to K-12 STEM education in the context of real-world issues can enhance motivation for learning and improve student interest, achievement, and persistence. These outcomes have the potential to increase the number of students who consider pursuing a STEM-related field.

[3] INNOVATE: A Blueprint for Science, Technology, Engineering and Mathematics, in California Public Education. CDE, 2014. Page 9.

Acknowledgements - STEAM Taskforce

The San Diego County Office of Education STEAM Leadership Team invited a diverse group of San Diego arts educators, arts partners, recognized STEAM community leaders, and select San Diego Quality Criteria Task Force members, to convene. All were tasked to synthesize STEM and STEAM criteria into an inclusive document; the result is the incorporation of the arts in a new, more dynamic view of integrated learning for San Diego County students via STEAM.

Appreciation is given to partners in the arts and arts education for the on-going dialog, input, and support including those memabers of the STEAM writing team:

Tim Benson, San Diego County Art Education Association and San Marcos Unified School District

Mary Kraus, San Diego County Office of Education, Integrated Technology Services

Nan Renner, University of California San Diego, Cognitive Science

Russ Sperling, San Diego County Office of Education, Visual and Performing Arts

Why STEAM?

Through STEM education students learn to become problem solvers, innovators, creators, and collaborators.[4] The developers of the SDSTEMQC came to the realization that inclusion of the arts or STEAM may accomplish these goals in a more comprehensive and complete way and may expand the accessibility of STEM/ STEAM concepts to more students.

The National Core Arts Standards: A Conceptual Framework for Arts Learning identifies four fundamental creative practices for the arts: imagination, investigation, construction, and reflection. The artistic process teaches students to observe patterns, perceive subtlety and nuance and to respond with curiosity and creativity. It allows them to engage with the work of others, the world around them, and their personal point of view, connecting disparate ideas in new ways, pushing them to design with intent and reflect with purpose.

Throughout history the arts have provided essential means for individuals and communities to express their ideas, experiences, feelings, and deepest beliefs.[5] The arts help individuals find their voice and appreciate the voices of others serving as a universal vehicle for expression that exists in all cultures and peoples. The arts cultivate empathy and sensitivity and celebrate unique perspectives, giving value and validation to diverse student life experiences regardless of culture, language or ability. Given our dynamic world, artistic experiences and engagements for all students are critical to well being of individuals and society.

Howard Gardner defined intelligence as the ability to produce something of value in a culture and described nine types of intelligence: musical–rhythmic, visual–spatial, verbal–linguistic, logical – mathematical, bodily – kinesthetic, interpersonal, intrapersonal, and naturalistic and existentialist, and suggested that there may be more awaiting discovery.[6] One could argue all these forms of intelligence relate directly or indirectly to the arts. By including discrete and integrated arts instruction through STEAM we provide an opportunity through which students can apply and express their knowledge and skills in authentic and relevant contexts.

Artistically literate students possess the knowledge and understanding required to participate authentically in the arts. Fluency in the language(s) of the arts is the ability to create, perform/ produce/ present, respond, and connect through symbolic and metaphoric forms that are unique to the arts. It is embodied in specific philosophical foundations and lifelong goals that enable an artistically literate person to transfer arts knowledge, skills, and capacities to other subjects, settings, and contexts.[7]

By recognizing that reciprocal processes exist and through convergence of practices and standards between science, technology, engineering, arts and mathematics instruction we further our vision of an integrated STEAM education for all.

[4] INNOVATE: A Blueprint for Science, Technology, Engineering and Mathematics, in California Public Education. CDE, 2014
[5] "A Conceptual Framework for Arts Learning - National Core ..." 2014. 18 Aug. 2015
[6] Gardner, Howard (1983,1999), Frames of Mind: The Theory of Multiple Intelligences and Intelligence Reframed Basic Books, ISBN 0133306143, ISBN 9780465026111
[7] "A Conceptual Framework for Arts Learning - National Core ..." 2014. 18 Aug. 2015

Attribute	Component
1a. Integrity of Academic Content	1a.1 Integrated Learning 1a.2 Alignment with Standards 1a.3 Essential Conditions for Successful Technology Integration
1b. STEM/STEAM Climate and Culture	1b.1 On-going Professional Development in STEM/STEAM 1b.2 Building Capacity and Momentum around STEM/STEAM 1b.3 Engaging All Students in STEM/STEAM 1b.4 Materials and Facilities for STEM/STEAM
2. Collaboration Among School, Community and Industry	2.1 STEM/STEAM Plan 2.2 STEM/STEAM Network 2.3 Engagement with STEM/STEAM Partners
3. Connections with College and Career Readiness	3.1 Alignment to College and STEM/STEAM Career Pathways 3.2 Dedicated Time for Science and Mathematics Instruction 3.3 Dedicated time for Visual and Performing Arts Instruction for (STEAM)

Figure 2. Attributes for Quality K-12 STEM/STEAM

Overview and Architecture of the Criteria for Quality STEM/STEAM in San Diego

The **SDQC** has been designed as a tool to support schools and programs in refining, improving, and supporting STEM/STEAM efforts. When used as part of a collaborative analysis and goal setting process, it has the potential to guide the thinking and decision making process.

This tool can help schools and programs analyze information and evidence in relation to four primary attributes and 13 components that are introduced in the **SDQC** (see Figure 2). These attributes and components, and the related elements described in detailed further in this document, reflect the synthesis of research from eleven states with similar tools. The San Diego STEM Quality Criteria Task Force and the San Diego STEAM Taskforce reviewed the work of other states and reached consensus around the following attributes, components, and elements:

Attributes 1.a (Integrity of the Academic Content) and 1.b (STEM/STEAM Climate and Culture) are interconnected to each other and work together. They describe the conditions that need to exist to establish a quality STEM/STEAM school or program, with particular emphasis on the implementation of standards. Attribute 2 establishes the need for a school or program to exist beyond the walls of a classroom, enriched by connections to the larger community and industry. In addition it outlines the need for a clear plan and vision for STEM/STEAM education through a well thought out plan. Attribute 3 outlines some of the conditions to support college and career readiness for both STEM and STEAM career pathways.

Criteria for Quality STEM/STEAM in San Diego Categories

The **SDQC** uses a unique set of categories to identify the current state of the STEM/STEAM school or program and what might be the next step in improvement efforts.

STEM/STEAM Developing - The school or program is beginning to develop capacity for a particular element but more work needs to be done.

STEM/STEAM For ALL - All students in the school or program are engaged in STEM/STEAM learning. *For many schools and programs, this is the target level for STEM/STEAM education they are seeking.*

STEM/STEAM Focus - The school or program is working toward using STEM/STEAM as an integral part of its identity and marketing. By so doing, it is making efforts to ensure all students have an in-depth STEM/STEAM experience.

STEM/STEAM Exemplar - The school or program has reached a high level of accomplishment in its STEM/STEAM efforts. Specifically, the school has created a sustainable and rewarding program and has evidence that its efforts have closed access and/or achievement gaps for students.

Across the categories, the use of words such as *seldom, occasionally*, and *regularly* (or other sets of words) are used to designate a level of implementation of an element. Given the uniqueness of each school or program, these words are used to prevent the rubric from defining an arbitrary criteria that would be forced upon users. Users of this tool will need to discuss with stakeholders what quantities, if any, need to be assigned to a particular word. For example, regularly may refer to quarterly in one school but monthly in another. Neither amount is considered more ideal as long as the needs of the school or program are met and if there is sufficient evidence to support that designation.

ATTRIBUTE 1A: INTEGRITY OF THE ACADEMIC CONTENT

COMPONENT 1a.1 Integrated learning[8]

Element	STEM/STEAM Developing	STEM/STEAM for ALL	STEM/STEAM Focus	STEM/STEAM Exemplar
1a.1.1 Interdisciplinary learning[9]	Students have the opportunity to engage in at least **one** interdisciplinary learning experience.	Students have the opportunity to engage in **several** interdisciplinary learning experiences.	Students **regularly** engage in interdisciplinary learning experiences.	All elements of 1a.1 are at STEM/STEAM Focus level. Integrated learning is the vehicle for instruction in the school and is central to student learning. The school stands as an example for other schools.
1a.1.2 Authentic problem solving[10]	Students **seldom** solve authentic problems as part of their learning.	Students **occasionally** solve authentic problems as part of their learning.	Students **regularly** solve authentic problems as part of their learning.	
1a.1.3 Performance-based tasks and assessments[11]	Students **seldom** engage in performance-based tasks and assessments.	Students **occasionally** engage in performance-based tasks and assessments.	Students **regularly** engage in performance-based tasks and assessments.	
1a.1.4 Personalization of learning environment[12]	Students **seldom** have choice over the design, delivery, content or demonstration of their learning.	Students **occasionally** have choice over the design, delivery, content or demonstration of their learning.	Students **regularly** have choice over the design, delivery, content or demonstration of their learning.	

[8]Integrated Learning refers to learning experiences that help students make connections across curricula and with real-world problems or experiences.
[9]Interdisciplinary Learning integrates knowledge and modes of thinking from two or more disciplines (or well established fields of study) in order to create products, raise questions, solve problems, and offer explanations of the world around them in ways that would not have been possible through single disciplinary means (adapted from Boix Mansilla & Gardner, 1996)
[10]Authentic problems refer to problems children can tie them to their real life experiences. Children engaged in authentic problem-based learning apply their science knowledge to questions they have about why things happen in their world, and they discuss the social ramifications that are often associated with scientific concepts.
[11]Performance tasks build on earlier content knowledge, process skills, and work habits and are strategically placed in the lesson or unit to enhance learning as the student "pulls it all together." Such performance tasks are not "add-ons" at the end of instruction. They are both an integral part of the learning and an opportunity to assess the quality of student performance. Performance tasks range from short activities taking only a few minutes to projects culminating in polished products for audiences in and outside of the classroom. (see http://bit.ly/1t7AlVd)
[12]Personalized learning is tailoring learning for each student's strengths, needs and interests — including enabling student voice and choice in what, how, when and where they learn — to provide flexibility and supports to ensure mastery of the highest standards possible. (Mean What You Say: Defining and Integrating Personalized, Blended and Competency Education, iNACOL Publication)

ATTRIBUTE 1A: INTEGRITY OF THE ACADEMIC CONTENT

COMPONENT 1a.2 Alignment with Standards[13]

Element	STEM/STEAM Developing	STEM/STEAM for ALL	STEM/STEAM Focus	STEM/STEAM Exemplar
1a.2.1 Focus on practice [14]	Classroom instruction **occasionally** includes explicit student engagement with the practices of the standards.	Classroom instruction **regularly** includes explicit student engagement with the practices of the standards.	Classroom instruction **always** includes explicit student engagement with the practices of the standards.	All elements of 1a.2 are at STEM/STEAM Focus level. Instruction is clearly aligned to standards and integrated learning. Student achievement reflects this alignment.
1a.2.2 Student discourse and communication	Students **seldom** engage in discourse with each other and their teacher through speaking, listening, and writing.	Students **occasionally** engage in discourse with each other and their teacher through speaking, listening, and writing.	Students **regularly** engage in discourse with each other and their teacher through speaking, listening, and writing.	
1a.2.3 Student collaboration	Students **seldom** have opportunity to collaborate in small group or teams to collaborate to answer questions, build understanding, and solve problems, or complete projects.	Students **occasionally** have opportunity to collaborate in small group or teams to collaborate to answer questions, build understanding, and solve problems, or complete projects.	Students **regularly** have opportunity to collaborate in small group or teams to collaborate to answer questions, build understanding, and solve problems, or complete projects.	

[13]Standards refer to the Common Core State Standards for English Language Arts and Mathematics, the Next Generation Science Standards, National Core Arts Standards, International Society for Technology in Education (ISTE) Standards: Students and Career Technical Education Standards. Infers inclusion of Common Core State Anchor Standards which specifically address technology integration including: "Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others, integration of diverse media and formats; Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally; Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.

[14]Practices refer to the Science and Engineering Practices of the Next Generation Science Standards, the Standards for Mathematical Practice, International Society for Technology in Education (ISTE) Standards for Students, Visual and Performing Arts artistic process from National Core Arts Standards and the Capacities of Literate Individuals in English Language Arts. See Appendix A of this document for a list of these practices.

ATTRIBUTE 1A: INTEGRITY OF THE ACADEMIC CONTENT

COMPONENT 1a.3 Essential Conditions for Successful Technology Integration[15]

Element	STEM/STEAM Developing	STEM/STEAM for ALL	STEM/STEAM Focus	STEM/STEAM Exemplar
1a.3.1 Equitable Access to technology[16]	**Limited** access to robust and reliable access to current and emerging technologies and digital resources, with connectivity for all students, teachers, staff, and school leaders.	**Sufficient** access to robust and reliable access to current and emerging technologies and digital resources, with connectivity for all students, teachers, staff, and school leaders.	**Sufficient and cutting edge** access to robust and reliable access to current and emerging technologies and digital resources, with connectivity for all students, teachers, staff, and school leaders.	All elements of 1a.3 are at STEM/STEAM Focus level. Teachers and students use technology seamlessly and in innovative ways.
1a.3.2 Technical Support	Teachers and students have **limited** access to consistent and reliable assistance for maintaining, renewing, and using ICT[17] and digital learning resources.	Teachers and students have **quick** access to consistent and reliable assistance for maintaining, renewing, and using ICT and digital learning resources.	Teachers and students have **immediate** access to consistent and reliable assistance for maintaining, renewing, and using ICT and digital learning resources.	
1a.3.3 Shared Vision	**Limited** proactive leadership in developing and sustaining a shared vision for educational technology among all education stakeholders.[18]	**Sufficient** proactive leadership in developing and sustaining a shared vision for educational technology among all education stakeholders.	**Established & institutionalized** proactive leadership in developing and sustaining a shared vision for educational technology among all education stakeholders.	
1a.3.4 Support Policies (including funding)	**Limited** policies and initiatives are in place to support the effective implementation of technology for achieving curriculum and learning technology (ICT) standards.	**Sufficient** policies and initiatives are in place to support the effective implementation of technology for achieving curriculum and learning technology (ICT) standards.	**Established & institutionalized** policies and initiatives are in place to support the effective implementation of technology for achieving curriculum and learning technology (ICT) standards.	
1a.3.5 Teachers use and application of technology[19]	Teachers **seldom** model and apply the ISTE Standards for Students (Standards-S) as they design, implement, and assess learning experiences to engage students and improve learning, enrich professional practice; and provide positive models for students, colleagues, and the community.	Teachers **occasionally** model and apply the ISTE Standards for Students (Standards-S) as they design, implement, and assess learning experiences to engage students and improve learning, enrich professional practice; and provide positive models for students, colleagues, and the community.	Teachers **regularly** model and apply the ISTE Standards for Students (Standards-S) as they design, implement, and assess learning experiences to engage students and improve learning, enrich professional practice; and provide positive models for students, colleagues, and the community.	
1a.3.6 Students use and application of technology[20]	Students **seldom** use and apply technology to create, produce, communicate, collaborate, analyze, problem solve, think critically and demonstrate understanding of digital citizenship and technology operations and concepts.	Students **occasionally** use and apply technology to create, produce, communicate, collaborate, analyze, problem solve, think critically and demonstrate understanding of digital citizenship and technology operations and concepts.	Students **regularly** use and apply technology to create, produce, communicate, collaborate, analyze, problem solve, think critically and demonstrate understanding of digital citizenship and technology operations and concepts.	

[15] Reflects the International Society for Technology in Education (ISTE) Essential Conditions
[16] Infers accessible and reliable infrastructure, hardware and digital content
[17] I CT: Information Communication Technology
[18] Stakeholders include teachers and support staff, school and district administrators, teacher educators, students, parents, and the community.
[19] Reflects the International Society for Technology in Education (ISTE) Standards: Teachers (Standards-T)
[20] Reflects the International Society for Technology in Education (ISTE) Standards: Students (Standards-S). ISTE Standards for Students (ISTE Standards•S) are the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. Digital age skills are vital for preparing students to work, live and contribute to the social and civic fabric of their communities.

ATTRIBUTE 1B: STEM/STEAM CLIMATE AND CULTURE

COMPONENT 1b.1 On-going Professional Development in STEM/STEAM[21]

Element	STEM/STEAM Developing	STEM/STEAM for ALL	STEM/STEAM Focus	STEM/STEAM Exemplar
1b.1.1 Frequency of STEM/STEAM professional development	Teachers and administrators **seldom** receive professional development in STEM/STEAM.	Teachers and administrators **occasionally** receive professional development in STEM/STEAM.	Teachers and administrators **regularly** receive professional development in STEM/STEAM.	All elements of 1b.1 are at STEM/STEAM Focus level.
1b.1.2 Focus on STEM/STEAM professional development	STEM/STEAM professional development happens for a **few** teachers and is **in-addition** to other site professional development.	STEM/STEAM professional development happens for **most** teachers and is part of **regular** site professional development.	STEM/STEAM professional development happens for **all** staff (teachers, administrators, counselors, other staff) and is **focus** for site professional development.	
1b.1.3 STEM/STEAM professional learning communities[22]	School is **developing** STEM/STEAM professional learning communities to align STEM/STEAM practices.	School has **established** STEM/STEAM professional learning communities to align STEM/STEAM practices.	School is **on-going** STEM/STEAM professional learning communities to align STEM/STEAM practices.	

COMPONENT 1b.2 Building Capacity and Momentum Around STEM

Element	STEM/STEAM Developing	STEM/STEAM for ALL	STEM/STEAM Focus	STEM/STEAM Exemplar
1b.2.1 Exhibition and celebration of STEM/STEAM efforts[23]	The school implements at least **one** event that exhibits and celebrates student and teacher efforts in STEM/STEAM.	The school implements **several** events that exhibits and celebrates student and teacher efforts in STEM/STEAM.	The school **regularly** implements events that exhibits and celebrates student and teacher efforts in STEM/STEAM.	All elements of 1b.2 are at STEM/STEAM Focus level.
1b.2.2 Culture of innovation and creativity[24]	Innovation and creativity are **not** emphasized and/or celebrated in student and teacher work.	Innovation and creativity are **sometimes** emphasized and/or celebrated in student and teacher work.	Innovation and creativity are **regularly** emphasized and/or celebrated in student and teacher work.	
1b.2.3 Communication Efforts	Communication tools and social media are **seldom** used to communicate STEM/STEAM efforts in the school.	Communication tools and social media are **occasionally** used to communicate STEM/STEAM efforts in the school.	Communication tools and social media are **regularly** used to communicate STEM/STEAM efforts in the school.	

[21]Examples of on-going professional development in STEM/STEAM include teachers receiving subject-matter specific instruction as well as strategies for integrated approaches to STEM/STEAM learning; technology-related professional learning plans and opportunities with dedicated time to practice and share ideas; teachers developing their own STEM/STEAM-specific learning goals; implementation of STEM/STEAM lessons/units across disciplines; professional learning happening in collaboration with industry and community partners; teachers receiving professional development from outside sources (including universities).

[22]STEM/STEAM Professional Learning Community activities include discussion on how to implement STEM/STEAM projects into coursework; analyzing and reflecting on student work; discussing strategies for using the results of student assessment to inform instruction; co-creating student formative and summative assessments; STEM/STEAM teachers regularly collaborating to develop STEM/STEAM coursework and share best practices.

[23]Examples include science night; STEM/STEAM fest; district leaders and school board acknowledge and celebrating STEM/STEAM achievement and development; all students participating in a variety of STEM/STEAM projects or exhibitions; peers and professionals advising, reviewing, and celebrating accomplishments at school and in the community; students participating and receiving recognition in regional competitions and exhibitions.

[24]Culture of Creativity and Innovation includes identifying several local issues or challenges that teachers and students will address with innovative solutions; encouraging and building student and teacher confidence in taking calculated risks; use of technology applied to innovations in STEM/STEAM; school leaders acknowledging and allowing time necessary for unstructured, purposeful time for student and teacher innovation; creativity and risk taking are rewarded.

ATTRIBUTE 1B: STEM/STEAM CLIMATE AND CULTURE

COMPONENT 1b.3 Engaging All Students in STEM/STEAM

Element	STEM/STEAM Developing	STEM/STEAM for ALL	STEM/STEAM Focus	STEM/STEAM Exemplar
1b.3.1 Outreach, support, and focus on underserved students[25]	The school **does not have** guidelines and/or practices in place that explicitly focus on increasing underrepresented group participation in STEM/STEAM activities.	The school **is developing** guidelines and/or practices that explicitly focus on increasing underrepresented group participation in STEM/STEAM programs, courses and activities.	The school has **guidelines** and/or practices in place that explicitly focus on increasing underrepresented group participation in STEM/STEAM programs, courses and activities.	All elements of 1b.3 are at STEM/STEAM Focus level. Student involvement in STEM/STEAM matches the demographics of the school. Data demonstrates a closing of the achievement gap as a result of STEM/STEAM efforts.
1b.3.2 Student participation in STEM/STEAM	A **few** or only a **select numbe**r of students in the school participate in STEM/STEAM activities.	A **majority** of students in the school participate in STEM/STEAM programs, courses and activities.	**All** or most of the students in the school participate in STEM/STEAM programs, courses and activities.	
1b.3.3 Out-of-school and extracurricular STEM/STEAM activities	Out-of-school and extracurricular STEM/STEAM activities occur **independent** of learning in the school day.	**Some** out-of-school and extracurricular STEM activities connect to learning that occurs during the school day.	**All** out-of-school and extracurricular STEM/STEAM activities connect to learning that occurs during the school day.	

COMPONENT 1b.4 Materials and facilities for STEM/STEAM[26]

Element	STEM/STEAM Developing	STEM/STEAM for ALL	STEM/STEAM Focus	STEM/STEAM Exemplar
1b.4.1 Availability of materials for STEM/STEAM	Teachers have **no** or **minimal** access to high quality materials and resources to engage students in STEM/STEAM learning.	Teachers have **some** access to high quality materials and resources to engage students in STEM/STEAM learning.	Teachers have **sufficient** access to high quality materials and resources to engage students in STEM/STEAM learning.	All elements of 1b.4 are at STEM/STEAM Focus level.
1b.4.2 Use of space for STEM/STEAM	**No** or minimal space is set aside for STEM/STEAM teaching, learning and exhibition.	**Some** space is set aside for STEM/STEAM teaching, learning and exhibition.	**Sufficient** space is set aside for STEM/STEAM teaching, learning and exhibition.	

[25]Outreach, Support, and Focus on Underserved Students - Identify guidelines and/or practices explicitly focused on increasing long-term participation by students from underrepresented groups in the STEM/STEAM education pipeline Implement practices explicitly focused on increasing long-term participation by students from underrepresented groups in the STEM/STEAM education pipeline. STEM/STEAM program focus participants reflect the demographics of the school. All students participate in a school-wide STEM/STEAM program.

[26]For a complete description of "technology materials & facilities" refer to 1a.3 "Essential Conditions for Technology Integration"

ATTRIBUTE 2: COLLABORATION AMONG SCHOOL, COMMUNITY AND INDUSTRY

COMPONENT 2.1 STEM/STEAM Plan[27]

Element	STEM/STEAM Developing	STEM/STEAM for ALL	STEM/STEAM Focus	STEM/STEAM Exemplar
2.1.1 STEM/STEAM plan in place	The school is **developing** a STEM/STEAM plan with goals and strategies that align to school-wide goals.	The school has **developed** a STEM/STEAM plan with goals and strategies that align to school-wide goals.	The school has **developed** and is **continually revising** a STEM/STEAM plan with goals and strategies that align to school-wide goals.	All elements of 2.1 are at STEM/STEAM Focus level.
2.1.2 Financial resources for STEM/STEAM[28]	**No** or **minimal** financial resources are allocated to ensure that STEM/STEAM goals can be accomplished.	**Some** financial resources are allocated to ensure that STEM/STEAM goals can be accomplished.	**Adequate** financial resources are allocated to ensure that STEM/STEAM goals can be accomplished.	
2.1.3 Communication and monitoring of STEM/STEAM plan	School staff, parents, and partners are **unaware** or **unable** to describe goals and strategies of STEM/STEAM plan.	School staff, parents, and partners are able to describe **some** of the goals and strategies of STEM/STEAM plan.	School staff, parents, and partners are able to describe **in detail** the goals and strategies of STEM/STEAM plan.	

COMPONENT 2.2 STEM Network

Element	STEM/STEAM Developing	STEM/STEAM for ALL	STEM/STEAM Focus	STEM/STEAM Exemplar
2.2.1 Collaboration in a STEM/STEAM network	The school is **seeking** partnerships with other schools, community organizations, postsecondary institutions, and businesses to identify solutions for executing a quality STEM/STEAM program.	The school has **at least one** partnership with a school, community organization, postsecondary institution, or business to identify solutions for executing a quality STEM/STEAM program.	The school has **several** partnerships with schools, community organizations, postsecondary institutions, and businesses to identify solutions for executing a quality STEM/STEAM program.	All elements of 2.2 are at STEM/STEAM Focus level. STEM/STEAM network is a vital part of the STEM/STEAM efforts. There is evidence of sustained partnerships and collaboration.
2.2.2 Stakeholders and Funding[29]	The school **seldom** or does not host or participate in meetings of community stakeholders who identify strategies and funding streams to support and sustain STEM/STEAM programs.	The school **occasionally** hosts or participates in meetings of community stakeholders who identify strategies and funding streams to support and sustain STEM/STEAM programs.	The school **regularly** hosts or participates in meetings of community stakeholders who identify strategies and funding streams to support and sustain STEM/STEAM programs.	

COMPONENT 2.3 Engagement with STEM Partners

Element	STEM/STEAM Developing	STEM/STEAM for ALL	STEM/STEAM Focus	STEM Exemplar
2.3.1 Students interact with STEM/STEAM partners[30]	Students **seldom** interact with STEM/STEAM partners.	Students **occasionally** interact with STEM/STEAM partners.	Students **regularly** interact with STEM/STEAM partners.	All elements of 2.3 are at STEM/STEAM Focus level. STEM/STEAM partners are a vital part of STEM/STEAM efforts in the school.
2.3.2 Teachers interact with STEM/STEAM partners[31]	Teachers **seldom** interact with STEM/STEAM partners.	Teachers **occasionally** interact with STEM/STEAM partners.	Teachers **regularly** interact with STEM/STEAM partners.	

[27]The STEM/STEAM Plan may be incorporated into an established school plan. It does not have to be a plan unto itself.
[28]See International Society for Technology in Education (ISTE) Essential Conditions which are reflected in 1a.3.
[29]Stakeholders may include school staff, parents, community organizations, industry and business partners, and postsecondary institutions.
[30]Interactions include job-shadows, internships, field trips, guest speakers, etc.
[31]Interactions include professional learning, externships, etc.

ATTRIBUTE 3: CONNECTIONS WITH COLLEGE AND CAREER READINESS

COMPONENT 3.1 Alignment to College and STEM/STEAM Career Pathways

Element	STEM/STEAM Developing	STEM/STEAM for ALL	STEM/STEAM Focus	STEM/STEAM Exemplar
3.1.1 Vertical planning	STEM/STEAM teachers **do not** meet with other teachers to vertically plan across school levels.	STEM/STEAM teachers **occasionally** meet with other teachers to vertically plan across school levels.	STEM/STEAM teachers **regularly** meet with other teachers to vertically plan across school levels.	All applicable elements of 3.1 are at STEM/STEAM Focus level. Student interest in STEM/STEAM matches the demographics of the school. Engagement of underrepresented students are a major emphasis of STEM/STEAM efforts.
3.1.2 STEM opportunities	Information about postsecondary STEM/STEAM programs and career topics is **seldom** shared with counselors and teachers.	Information about postsecondary STEM/STEAM programs and career topics is **occasionally** shared with counselors and teachers.	Information about postsecondary STEM/STEAM programs and career topics is **regularly** shared with counselors and teachers.	
3.1.3 Diverse course selection (high school only)	**No** courses in STEM/STEAM related career fields are available to students either face-to-face or virtually.	A **few** courses in STEM/STEAM related career fields are available to students either face-to-face or virtually.	**A wide variety** of courses in STEM/STEAM related career fields are available to students either face-to-face or virtually.	
3.1.4 Exploration of STEM careers for students	Students have **no** opportunity to explore STEM/STEAM careers.	Students have **some** opportunities to explore STEM/STEAM careers.	Students have **many** opportunities to explore STEM/STEAM careers.	
3.1.5 Counselor and student relationships (high school only)	Counselors and students **do not** meet to plan, discuss and track the connections and alignment of students' plans to careers and postsecondary education.	Counselors and students **seldom** meet to plan, discuss and track the connections and alignment of students' plans to careers and postsecondary education.	Counselors and students **occasionally** meet to plan, discuss and track the connections and alignment of students' plans to careers and postsecondary education.	

COMPONENT 3.2 Dedicated Time for Science and Mathematics Instruction[32]

Element	STEM/STEAM Developing	STEM/STEAM for ALL	STEM/STEAM Focus	STEM/STEAM Exemplar
3.2.1 Elementary school (K-5)	Elementary students **do not receive** daily instruction in mathematics and science.	Elementary students **receive** daily instruction in mathematics and science.	Elementary students receive **extended** daily instruction in mathematics and science with options for integrated or extra-curricular STEM/STEAM activities and/or electives.[33]	All applicable elements of 3.2 are at STEM/STEAM Focus level.
3.2.2 Middle school (6-8)	Middle schools students **do not receive** 3 full years of science and mathematics instruction.	Middle schools students **receive** 3 full years of science and mathematics instruction.	Middle schools students receive 3 full years of science and mathematics instruction with options for integrated or extra-curricular STEM activities and/ or electives.[34]	
3.2.3 High school	High school students **do not receive** 2 full years of science and mathematics instruction.	High school students **receive** 2 full years of science and mathematics instruction.	High school students receive **3** full years of science and mathematics instruction with **opportunities in Career Technical Education courses** options for integrated or extra-curricular STEM/STEAM activities and/ or electives.[35]	

[32]Dedicated time may be leveraged through interdisciplinary teaching and learning.
[33]Integrated or extra-curricular STEM activities may include coding, robotics or other applied mathematics and/or science engineering
[34]"STEM electives" may include coding, robotics, or basic engineering course or activities
[35]"STEM electives" may include Computer Science, AP Computer Science or access to ICT Industry programming, networking and/or hardware engineering certifications

ATTRIBUTE 3: CONNECTIONS WITH COLLEGE AND CAREER READINESS

COMPONENT 3.3 Dedicated Time for Visual and Performing Arts (VAPA) Instruction (for STEAM)

Element	STEAM Developing	STEAM for ALL	STEAM Focus	STEAM Exemplar
3.3.1 Elementary School (K-5)	Elementary school students **participate in** visual and performing arts depending on teacher interest.	Elementary school students **receive** instruction every week in visual and performing arts.	Elementary school students **receive** instruction multiple times per week in visual and performing arts with options for integrated or extracurricular STEAM or arts activities and/or electives.	All applicable elements of 3.3 are at STEAM focus level *and contributing to advancement of STEM/STEAM education.*
3.3.2 Middle School (6-8)	Middle school students **may have access** to visual and performing arts electives or after school programs.	Middle school students **have access** to multiple forms of visual and performing arts electives and are encouraged to take a least two semesters of VAPA.	Middle school students **have access** to visual and performing arts electives and are expected to complete three years of VAPA coursework, with options for integrated or extra-curricular STEAM or arts activities and/or electives.	
3.3.3 High School (9-12)	High school students **have access** to visual and performing arts electives and are required to take a least two semesters of VAPA as part of their graduation requirement.	High school students **have access** to a variety of visual and performing arts electives and are required to take at least two semesters of VAPA as part of their graduation requirement, and encouraged to take two or more years of VAPA in the same arts discipline.	High school students **have access** to visual and performing arts electives and are expected to complete at least two years of VAPA coursework within the same arts discipline, with opportunities in **Career Technical Education** courses and options integrated or extra-curricular STEAM or arts activities and/or electives.	

Appendix A: Practices and Capacities of the Standards

Science and Engineering Practices of the Next Generation Science Standards	Standards for Mathematical Practice from the Common Core State Standards	Capacities of Literate Individuals in English Language Arts from the Common Core State Standards	International Society for Technology in Education (ISTE) Standards for Students	Visual and Performing Arts artistic processes from National Core Arts Standards
Asking questions (for science) and defining problems (for engineering)	Make sense of problems and persevere in solving them	Demonstrates independence in reading complex texts, writing and speaking about them	Demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology	Creating Conceiving and developing new artistic ideas and work
Developing and using models	Reason abstractly and quantitatively	Build a strong base of knowledge through content rich texts	Use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others	Performing/Presenting/Producing Performing (Performing Arts): Realizing artistic ideas and work through interpretation and presentation
Planning and carrying out investigations	Construct viable arguments and critique the reasoning of others	Obtain, synthesize, and report findings clearly and effectively in response to task and purpose	Apply digital tools to gather, evaluate, and use information	Presenting (Visual Arts): Interpreting and sharing artistic work
Analyzing and interpreting data	Model with mathematics	Construct viable arguments and critique reasoning of others	Use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources	Producing (Media Arts): Realizing and presenting artistic ideas and work
Using mathematics and computational thinking	Use appropriate tools strategically	Read, write, and speak grounded in evidence	Understand human, cultural, and societal issues related to technology and practice legal and ethical behavior	Responding Understanding and evaluation how the arts convey meaning
Constructing explanations (for science) and designing solutions (for engineering)	Attend to precision	Use technology and digital media strategically and capably	Demonstrate a sound understanding of technology concepts, systems, and operations	Connecting Relating artistic ideas and work with personal meaning and external context
Engaging in argument from evidence	Look for and make use of structure	Come to understand other perspectives and cultures through reading, listening, and collaborations		
Obtaining, evaluating, and communicating information	Look for and express regularity in repeated reasoning			

Appendix B: SDQC Self-Assessment Tool

Attribute 1a: *Integrity of the Academic Content*		
ELEMENT	**RATING**	**EVIDENCE**
Component 1a.1: *Integrated Learning*		
1a.1.1 Interdisciplinary learning	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
1a.1.2 Authentic problem solving	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
1a.1.3 Performance-based tasks and assessments	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
1.a.1.4 Personalization of the learning environment	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
Component 1a.2: *Alignment with Standards*		
1a.2.1 Focus on practice	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
1a.2.2 Student discourse and communication	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
1a.2.3 Student collaboration	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	

Component 1a.3: *Essential Conditions for Successful Technology Integration*

ELEMENT	RATING	EVIDENCE
1a.3.1 Equitable access to technology	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
1a.3.2 Technical support	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
1a.3.3 Shared vision	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
1a.3.4 Support policies (including funding)	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
1a.3.5 Teachers use and application of technology	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
1a.3.6 Students use and application of technology	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	

Attribute 1b: *STEM Climate and Culture*

Component 1b.1: *On-going Professional Development in STEM/STEAM*

ELEMENT	RATING	EVIDENCE
1b.1.1 Frequency of STEM/STEAM professional development	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
1b.1.2 Focus on STEM/STEAM professional development	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
1b.1.3 STEM/STEAM professional learning communities	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	

Component 1b.2: *Building Capacity and Momentum around STEM/STEAM*

1b.2.1 Exhibition and celebration of STEM efforts	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
1b.2.2 Culture of innovation and creativity	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
1b.2.3 Communication Efforts	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	

Component 1b.3: *Engaging All Students in STEM/STEAM*

ELEMENT	RATING	EVIDENCE
1b.3.1 Outreach, support, and focus on underserved students	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
1b.3.2 Student participation in STEM /STEAM	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
1b.3.3 Out-of-school and extracurricular STEM /STEAM activities	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	

Component 1b.4: *Materials and Facilities for STEM/STEAM*

1b.4.1 Availability of materials for STEM /STEAM	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
1b.4.2 Use of space for STEM /STEAM	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	

Attribute 2: *Collaboration Among School, Community, and Industry*

Component 2.1: *STEM/STEAM Plan*

ELEMENT	RATING	EVIDENCE
2.1.1 STEM/STEAM plan in place	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
2.1.2 Financial resources for STEM/STEAM	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
2.1.3 Communication and monitoring of STEM/STEAM plan	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	

Component 2.2: *STEM /STEAM Network*

2.2.1 Collaboration in a STEM/STEAM network	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
2.2.2 Stakeholders and Funding	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	

Component 2.3: *Engagement with STEM/STEAM Partners*		
ELEMENT	**RATING**	**EVIDENCE**
2.3.1 Students interact with STEM/STEAM partners	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
2.3.2 Teachers interact with STEM/STEAM partners	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	

Attribute 3: *Connections with College and Career Readiness*

Component 3.1: *Alignment to College and STEM/STEAM Career Pathways*

ELEMENT	RATING	EVIDENCE
3.1.1 Vertical planning	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
3.1.2 STEM/STEAM opportunities	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
3.1.3 Diverse course selection (high school only)	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
3.1.4 Exploration of STEM/STEAM careers for students	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
3.1.5 Counselor and student relationships (high school only)	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	

Component 3.2: *Dedicated Time for Science and Mathematics Instruction*		
ELEMENT	**RATING**	**EVIDENCE**
3.2.1 Elementary school (K-5)	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
3.2.2 Middle school (6-8)	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
3.2.3 High school	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
Component 3.3: *Dedicated Time for Visual and Performing Arts (VAPA) Instruction (for STEAM)*		
3.3.1 Elementary school (K-5)	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
3.3.2 Middle school (6-8)	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	
3.3.3 High school	STEM/STEAM Developing ❑ STEM/STEAM for ALL ❑ STEM/STEAM Focus ❑ STEM/STEAM Exemplar ❑	

SDQC Self-Assessment Tool Summary

Strengths, Celebrations, and Accomplishments

Based on your self-assessment, what are your areas of strength worth celebrating?

Opportunities and Next Steps

Based on your self-assessment, what are some opportunities or next steps for your STEM/STEAM school or program?

Goal and Action Plan

What is your goal for the next 12 months for your STEM/STEAM school/program? What attribute, component, and/or elements will your goal focus on?

Action Steps	Who is responsible to complete?	Timeline	Deliverable

Appendix C: San Diego STEM Quality Criteria Task Force Membership

Name	District/Organization
Michael Allman	La Mesa-Spring Valley
Clinton Anderson	National Elementary School District
Joe Austin	San Diego Unified School District
Leta Bender	San Diego Children and Nature Collaborative
Kim Bess	San Diego County Office of Education
Bruce Braciszewski	Classroom of the Future Foundation
Melanie Brown	Sweetwater Union High School District
Chelsea Cochrane	Sally Ride Science
Deborah Costa-Hernandez	California Reading & Literature Project
Tamara Davis	San Diego County Office of Education
Chris Deckard	SPAWAR Systems Center Pacific
Kent Deines	Doppler Ltd
April Diaz	Vista Unified School District
Rodger Dohm	Poway Unified School District
Stephanie Dominguez	Chula Vista Elementary
Kellie Fleming	Vista Unified School District
Karen Gegg	San Diego Unified School District
Dalilah Gil-Dang	National Elementary School District
Samantha Greenstein	San Dieguito Union High School District
Young Haagensen	Notre Dame Academy
Andy Johnston	Santee School District
Susan King	San Diego Unified School District
Mary Kraus	San Diego County Office of Education
Melissa Kruse	National Elementary School District
Jackie Ma	National Elementary School District
Trish Marapoti	Vista Unified School District

Name	District/Organization
Phyllis Morgan	San Dieguito Union High School
Jessica Newkirk	National Elementary School District
Laura Noonan	Coronado Unified School District
Julie Norby	Solana Beach School District
Taylor Olson	San Diego Model Railroad Museum
Ellen Peneski	San Diego STEM Collaboratory
Kim Richards	KDR PR / STEAMConnect
Sherry Risch	The Child's Primary School
Jim Rohr	SPAWAR Systems Center Pacific
Joanna Savarese-Levine	Ashford University
Susan Scott	Escondido Union Elementary School District
Mindy Shacklett	San Diego County Office of Education
Brian Shay	San Dieguito Union High
John Spiegel	San Diego County Office of Education
Sharon Stevens Allen	Community Member
Rachel Tarshes	San Diego Unified School District
Nancy Taylor	San Diego Science Alliance
Cristina Trecha	San Diego Science Project, UC San Diego
Kimberly Trench	an Diego Unified School District
Jorge Valdivieso	San Marcos Unified School District
Luz Vicario	National Elementary School District
Diane Wagener	Community Member
Bree Watson	Chula Vista Elementary School District
Ann Wellhouse	SDSU Student
Don Whisman	San Diego Unified School District

Appendix D: San Diego STEAM Task Force

The San Diego County Office of Education STEAM Leadership Team invited a diverse group of San Diego arts educators, arts partners, recognized STEAM community leaders and select STEM Criteria Task Force members to convene and to synthesize STEM and STEAM criteria into this document; the result is the incorporation of the arts in a new, more dynamic view of integrated learning for San Diego County students via STEAM. Appreciation is given to our partners in the arts and arts education for their on-going dialog, input, and support.

Name	District/Organization
Ed Abeyta	University of California San Diego Extension
Tim Benson	San Diego County Art Education Association and San Marcos Unified School District
Chelsea Cochrane	San Diego County Office of Education, Science
Rob Corona	San Diego Unified School District, STEAM
Tara Graviss	Young Audiences San Diego
Jeff Kover	Sweetwater Union High School District, Visual and Performing Arts
Mary Kraus	San Diego County Office of Education, Integrated Technology Services
Mark Nicholson	San Diego Unified School District, Visual and Performing Arts
Ellen Peneski	San Diego Science Alliance (SDSA)
Nan Renner	University of California San Diego, Cognitive Science
Kim Richards	KDR PR
Shane Schmeichel	Coronado Unified School District, Coronado School of the Arts
Dalouge Smith	San Diego Youth Symphony
Russ Sperling	San Diego County Office of Education, Visual and Performing Arts
John Spiegel	San Diego County Office of Education, Science