STEM Program Certification Rubric for High School

<table>
<tr><th>Criteria</th><th>0
No STEM Program in place</th><th>STEM 1</th><th>STEM 2</th><th>STEM 3
Ready for STEM Certification</th></tr>
<tr><td>1. STEM Program students</td><td>No students are identified as STEM.</td><td>STEM students are identified.</td><td>STEM students are identified and a selection process is described.</td><td>STEM students are identified, a selection process has been described and vetted, and there is longitudinal evidence (minimum of three years) it is working.</td></tr>
<tr><td colspan="5">ARTIFACTS THAT SUPPORT STEM EFFORTS
Examples:
• Students are selected based upon specific criteria (academic achievement, interest, standardized test scores, lottery, random selection, etc.) and all course options for STEM students are in a written document
• There is written evidence the selection process has been vetted with community, business partners, and parents
• Three plus years of documented success that the STEM population is growing</td></tr>
<tr><td>2. Non-traditional student participation in STEM (minorities, females, and economically disadvantaged)</td><td>The non-traditional student participation does not reflect the diversity and gender of the school district.</td><td>A plan is being developed for outreach, support, and focus on non-traditional student populations.</td><td>A plan is in place for outreach, support, and focus on non-traditional student populations.</td><td>The non-traditional student participation reflects the diversity and gender of the school district.</td></tr>
<tr><td>3. Characteristics of the STEM curriculum</td><td>Students in the STEM program follow a similar curriculum as students not in the STEM program.</td><td>A plan is being developed for an explicit and unique curriculum for STEM students or a specific curriculum for STEM students is currently implemented only an some of the school's grade levels.</td><td>There is a plan in place to expand an explicit and unique curriculum from grade level to multiple grade levels and to maintain sustainability.</td><td>STEM students are exposed to a unique and explicit curriculum that is different from non-STEM students and there is evidence of its sustainability (three plus years).</td></tr>
<tr><td colspan="5">ARTIFACTS THAT SUPPORT STEM EFFORTS
Examples:
• The curriculum offers opportunities for student presentations of investigations and findings.
• There is evidence that students engage in regular "arguments from evidence" during classroom instruction
• There are opportunities for students to interact with STEM professionals to support curriculum
• There are opportunities that involve older students working with high school students in the STEM program
• A specialized science, math, and/or engineering program(s) is being used
• There are opportunities for students to interact with museum/university partners to support curriculum</td></tr>
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4. Teacher Certification	None of the STEM teachers are certified.		All of the STEM teachers are certified or meet highly qualified status.	All of the STEM teachers are certified or meet highly qualified status and some may have business/industry experience.
5. Teacher Professional Learning	There is not STEM related professional development currently being planned or that has been offered in the last year.	25-74% of STEM teachers have on-going STEM specific (specific to their STEM focus) professional learning and there is evidence of its implementation in classroom instruction.	75% of STEM teachers have on-going STEM specific (specific to their STEM focus) professional learning and there is evidence of its implementation in classroom instruction.	100% of STEM teachers have on-going STEM specific (specific to their STEM focus) professional learning and there is evidence of its implementation in classroom instruction.

ARTIFACTS THAT SUPPORT STEM EFFORTS

Examples:

- STEM teachers attend content area national/regional conference
- STEM teachers have tailored their professional learning to their specific needs
- STEM teachers participate in a job-embedded or practice-based approach to professional learning
- STEM teachers attend content area state conference
- STEM teachers participate in project/problem-based learning professional learning
- STEM teachers participate in professional learning related to STEM integration
- STEM teachers participate in professional learning to strengthen STEM content knowledge and skills

6. Teacher Collaboration	There is no collaboration or it is not structured or planned.	Teachers collaborate quarterly to plan integrated lessons, share/co-create STEM activities, and plan learning outcomes.	Teachers have a set time they collaborate at least monthly together to plan integrated lessons, share/co-create STEM activities, and plan learning outcomes.	Teachers collaborate at least bi-monthly to plan integrated lessons, share/co-create STEM activities, and plan learning outcomes.
7. STEM Pathways	Students are not pathway completers	Some STEM students complete a pathway	~75% of STEM students complete a pathway	100% of STEM students complete a STEM CTAE* or Science and Mathematics pathway
8. Math & Science Instruction	Students do not take high level math and science coursework	<50% of the STEM students are enrolled in AP/IB/Dual Enrollment math & science courses	~75% the STEM students are enrolled in AP/IB/Dual Enrollment math & science courses. Additional supports are instituted to assist students in meeting these expectations.	All STEM students are enrolled in AP/IB/Dual Enrollment math & science courses. The school provides additional supports to assist students in meeting these expectations.
9. Business, Community, and Post-Secondary Partnerships	There are no business, community, and post-secondary	Plans are being developed to provide students opportunities to meet STEM partners and	Business, community, and post-secondary partnerships are involved in the STEM instructional program one-four	Business, community, and post-secondary partnerships are involved in an on-going relationship with the STEM instructional program and are directly connected to in-

	partnerships.	to participate in STEM learning environments directly connected to in-class learning.	times/school year and are directly connected to in-class learning.	class learning (Recommendation is one-four times per month).
ARTIFACTS THAT SUPPORT STEM EFFORTS Examples: • Speaker series • Job shadowing • Touring STEM business/industries • Student internships • Mentorships with students for projects/investigations • STEM career days/nights • Collaboration with teachers to design real world projects/problems • Partnership involvement in executing the STEM program, partnerships are purposeful, and mutually beneficial. • Museum or university partnerships • Virtual collaboration with partners				
10. STEM Competitions	No STEM students are involved in STEM competitions, on-site/online STEM exhibits, and/or in state and national STEM forums.	Some of the STEM students participate in STEM competitions on-site/online STEM exhibits, and/or in state and national STEM forums.	A majority of the STEM students participate in STEM competitions on-site/online STEM exhibits, and/or in state and national STEM forums.	All STEM students participate in STEM competitions on-site/online STEM exhibits, and/or in state and national STEM forums.
ARTIFACTS THAT SUPPORT STEM EFFORTS Examples: • Science Olympiad Team • Robotics Teams • District/state/national Science and Engineering Fair • Math Challenge Contests • Agricultural Competitions • STEM-related Career Technical Student Organization Competition • Environmental Science Competitions • Siemens We Can Change the World Challenge • Technology Association of Georgia Web Challenge • SECME Competitions				
11. Performance assessments	Students are only assessed using state and unit assessments.	In addition to state and unit assessments, teachers use multiple	In addition to state and unit assessments, multiple indicators of success in	In addition to state and unit assessments, all teachers & students are immersed in a student-centered learning environment

<table>
<tr><td></td><td></td><td>indicators of success in a STEM content area, including knowledge and performance-based assessments.</td><td>multiple STEM content areas, including knowledge and performance-based assessments.</td><td>that supports multiple indicators of success in all STEM content areas, including knowledge & performance-based assessments.</td></tr>
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Examples:
• Portfolios that allow students to portray their learning via collections of personal work
• Group projects that require planning, research, discussion/debate, and presentations
• Written products that require students to analyze and interpret data, construct explanations and design solutions, and engage in argument from evidence
• Experimentation that requires students illustrate their understanding of STEM concepts
• Self-assessment on products using rubrics
• Solving problems using real-world applications
• Student demonstrations that reflect mastery of STEM content and procedures
• A culminating project that integrates all the STEM content areas

Performance Assessments should contain the following characteristics:
1. Have meaning for students and teachers and motivate high performance.
2. Require the demonstration of complex cognition, applicable to important problem areas.
3. Exemplify current standards of content or subject matter quality.
4. Minimize the effects of ancillary skills that are irrelevant to the focus of assessment.
5. Possess explicit standards for rating or judgment.
Baker, E. L., O'Neill, H. F., Jr., & Linn, R. L. (1993). Policy and validity prospects for performance-based assessments. American Psychologist, 48, 1210-1218</td></tr>
<tr><td>12. Science, Technology, Engineering, and Mathematics Integration</td><td>There is little or no integration of STEM subjects.</td><td>25-50% of STEM teachers provide explicit assimilation of concepts from more than one STEM discipline and problems/projects require more than one discipline for solutions.</td><td>51-75% of STEM teachers provide explicit assimilation of concepts from more than one STEM discipline and problems/projects require more than one discipline for solutions.</td><td>75% or more of STEM teachers provide explicit assimilation of concepts from more than one STEM discipline and problems/projects require more than one discipline for solutions.</td></tr>
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Examples:
• Student work is designed around the Grand Challenges
• Refer to http:// NASA.gov for integrated projects ideas
• Green Energy
• Students generate knowledge that results in innovation.</td></tr>
<tr><td>13. STEM Labs</td><td>There is no STEM lab in the school</td><td>The STEM lab has only wet lab capability or only technology access.</td><td>The STEM lab(s) have wet lab capability and technology access but are</td><td>The STEM lab(s) have wet lab capability and technology access and are used by multiple teachers for collaboration,</td></tr>
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			only used by one teacher.	project work, virtual collaboration, and can be used as exhibition space.
14. Student Rigor & Relevance and Instructional Quality	Most of the learning occurs at the acquisition level. Content knowledge is taught in a silo by discipline and instruction focuses on knowledge awareness and comprehension of information. Classroom instruction is predominantly teacher centered.	Most of the learning occurs at the acquisition and application levels. Classroom instruction is predominantly teacher centered. Student work shows them working on designing solutions to problems centered on a discipline at a time by applying knowledge to new situations.	Most of the learning occurs at the assimilation levels. Classroom instruction is predominantly student centered and students extend and refine their acquired knowledge to routinely analyze & solve problems, as well as create unique solutions.	51-100% of learning occurs at the adaptation level. Classroom instruction is predominantly student centered and students have the competence to think in complex ways and also apply the knowledge & skills they have acquired. When confronted with perplexing unknowns, students are able to create solutions & take action that further develops their skills & knowledge.

ARTIFACTS THAT SUPPORT STEM EFFORTS

Examples:

- Students are asked to use extensive knowledge and skills to take action on perplexing problems with unknown solutions
- Student work is designed around a STEM community or business/industry problem
- Students work with university/business partners on real world projects/research
- Project products are exhibited that indicate quadrant D critical thinking skills are being used
- Involvement with a specialized science, math, and/or engineering program(s)
- A culture of inquiry, creativity, and innovation exists among students, teachers, and administrators.

15. Technology Integration	There is little or no technology integration supporting STEM teaching and learning.	A technology plan is in place to integrate a variety of technology tools supporting STEM teaching and learning.	Technology plan is implemented in STEM classrooms that include a variety of technology tools that are integrated at least weekly into STEM teaching and learning.	Technology use is ubiquitous throughout STEM classrooms and includes a variety of technology tools that are integrated seamlessly into STEM teaching and learning; the technology is consistently in the hands of students.

ARTIFACTS THAT SUPPORT STEM EFFORTS

Examples:

- Computer use is commonplace
- Computer-based, online, mobile, virtual, and other technology tools are integrated into STEM classwork
- Probes are used to collect and analyze data
- Tablets are in use with apps specific to the topic
- Graphing calculators may be used to solve problems at the upper elementary level
- STEM industry related technology is available for student use
- Products of 21st century technology tool use by students are visible throughout the school
- IT equipment is rarely inoperable

• Teachers and students receive on-going access and opportunity to expand their proficiency in technology use				
16. Accountability	The school did not meet state accountability measures for the past two consecutive years.	The school met minimum state accountability measures for two out of the past three years. There is a plan in place to meet accountability.	The school meets state accountability measures and STEM student scores are increasing by at least 1-10% in one STEM area.	The school meets/exceeds state accountability STEM student scores are increasing by at least 1-10% in all STEM areas.

***Georgia Department of Education CTAE STEM Pathways**

Computer Science

Health Care Science

Engineering & Technology

Agricultural Sciences (Animal & Plant Sciences)

Food & Nutrition Sciences