North Carolina

STEM School Progress Rubric

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INTRODUCTION

Intended Purpose of this Rubric

Vision

The North Carolina STEM School Progress Rubric points toward a vision in which North Carolina schools provide bountiful learning environments that enrich each of their students' lives, giving the students knowledge, experiences, and skills that propel them to becoming independent and thriving young people. To that end, this document is a strategic planning tool, or "roadmap," intended to support educators, schools, and districts who have chosen specifically to enhance the STEM education they provide to students. The tool describes the characteristics of a high-quality STEM school and is designed to help school teams reflect on the current stage of their work, create sustainable plans, experiment with innovations, determine next steps, and track their progress.

The North Carolina STEM School Progress Rubric is built on earlier versions of the North Carolina STEM Attribute Implementation Rubric, created in 2012 by a partnership between The North Carolina Department of Public Instruction (NCDPI), The North Carolina Science, Mathematics, and Technology Education Center, The Golden LEAF Foundation, and The Friday Institute at North Carolina State University. The North Carolina Department of Public Instruction uses this rubric as the framework for the *NC STEM Schools of Distinction* recognition program. For more information about the recognition program, visit: https://www.dpi.nc.gov/districts-schools/classroom-resources/k-12-standards-curriculum-and-instruction/programs-and-initiatives/stem-education-and-leadership/stem-schools-distinction

What is STEM Education?

The North Carolina STEM School Progress Rubric was developed based on ideas captured in earlier versions (as noted above), as well as leading national research (see "References"). At the same time, the rubric is not overly prescriptive. There is no "right answer" or "one way" to carry-out much of what is described below. Many terms, ideas, and processes presented in the rubric should be given specific definition at the local level in a way that best suits the school and community. For example, there is not one, right way to define and implement "project-based learning." Nor is there one way "to consistently honor, encourage, and incentivize innovation in STEM by students." Descriptions of terms have been provided in a glossary, but these are not intended to be final definitions. Furthermore, external roadblocks to achieving the goals laid out in the rubric may exist. These barriers vary greatly across schools and communities, and there is no single, right way to work with and around such barriers when implementing the ideas described in the rubric.

There is legitimate statewide, national, and international debate about what ideas and activities are "STEM" and what are not. This debate has existed in Western society for centuries, albeit under different terms such as "sciences" and "humanities". For schools, this debate often plays out in course catalogs. Within a course-structure some courses clearly fall into one category or another, and others do so less clearly. While the North Carolina STEM School Progress Rubric celebrates and encourages the power of high-quality education in STEM subjects, this is with a clear-eyed recognition of the equal value that humanities subjects contribute to society. Arts and humanities practices aim to understand and celebrate individual and collective human experience, to which traditional science and STEM practices can be applied and vice versa. One should not be sacrificed for the other. It is possible for a school to educate students on both ways of knowing. The rubric was written to recognize the validity of this debate and allow for definition at the local level in a way that best suits that school or community and fosters local leadership and ownership.

That being said, most Career and Technical Education (CTE) courses fall into the category of STEM courses or scientific investigations. Instead of isolating CTE from the broader programming in a school or district, CTE courses should be fully integrated into strategic plans and operations. Quite often these courses offer some of the best STEM learning opportunities, but they have not been fully leveraged across a school or district. CTE courses, certificates, activities for students, and other contributions should be included as part of a school's STEM education plan. To an observer of a high-quality STEM school, there should be no obvious difference between the function of a CTE course and any other STEM course in the school. Additionally, the underrepresentation of students who are members of certain social groups – namely females, people from lower socioeconomic backgrounds, people of color – in some STEM education pathways needs to change. High-quality STEM schools actively work to change these trends by recognizing and leveraging the strengths of students who are members of these groups, while also addressing the specific challenges they face.

Guide for Use

For All Users

Due to the multifaceted, systemic nature of building high-quality STEM education into the daily work of a school, it is critical that this rubric be used not by an individual at a school, but by a representative school leadership team. If it is used by only one or two school staff to make isolated and insulated decisions, the final results for the school will be smaller, weaker, and possibly shorter-lived than they could have been with a more challenging but ultimately more effective democratic decision-making process. School leadership team representatives could include, for example: principal, teacher representatives from STEM and non-STEM subject areas, grade-level teacher representatives, student representatives, instructional coaches, counselors, bookkeeper, school library media coordinator, instructional technology facilitator, among others.

This rubric is organized into five Overarching Principles of a STEM school: "Student Opportunities;" "Classroom Environment;" "School Structures;" "School Culture;" and "Community Connections." Each Overarching Principle is broken down into 3-5 Key Elements (e.g., "Students Designing," "Professional Learning Focus," "STEM Business Advisory Council," etc.). Each Key Element consists of 1 or more quality indicators (bullets) describing the particular characteristics of a school.

Members of the school leadership team can work individually to rate their school, followed by a process of either combining these individual scores or coming to consensus to create a single set of school-wide ratings. Or the leadership team may meet several times to rate collectively their school's progress on each of the Key Elements (20 Key Elements for elementary and middle schools and 22 for high schools). The team may rate their school's progress as either "Early," "Developing," "Prepared," or "Model." **The more data (quantitative or qualitative, formal or informal, etc.) that can be used to inform the ranking process, the more accurate and effective the strategic planning process will be.** Examples of useful data include everything from counts of student and teacher activities or records of student work, to school survey results, formal or informal student and teacher interview data, classroom observations, etc. This data can continue to be collected, perhaps annually, to compare changes over time. A spreadsheet can track a school's annual self-assessment scores, and notes alongside Key Elements can document what reflections and data were used to make the determinations. Schools can create data collection systems to make this annual process efficient, enabling year to year adjustment and improvement.

To make the scoring system the most effective, the following rule should be used: all indicators (bullets) within a particular cell should be able to be marked as achieved for a school to give itself the particular ranking assigned to that cell (Early, Developing, Prepared, or Model). For example, if the school has achieved only two of three bullets listed in the "Prepared" cell, then the school should rank itself as "Developing." The school can rank itself as Prepared once it has achieved all three indicators listed. To support this process, a scoring sheet is provided in Appendix A.

Throughout the rubric subjective words like "few," "many," "occasionally," or "frequently" are sometimes used. This is done so that the rubric is not overly prescriptive and can be used effectively by both small schools and large schools, and by both schools with well-established support and schools striking-out on their own. Schools should decide what the most effective definition of those terms is for their own organizations and document their decisions to measure progress over time. To support the process of rubric interpretation, descriptions of terms are provided in Appendix B.

Once a self-assessment of the school's progress has been completed, the leadership team should reflect on the results and identify priority areas for improvement and plans for sustainability. The team might ask, "What are our priority areas for right now? What are our short-term goals and what are our long-term goals? What are one to three action steps that can be taken to move closer to achieving our desired goals? What structures need to be put in place now so that this work can continue into the foreseeable future?" To support this process, a data interpretation guide is provided in Appendix C.

For Applicants to North Carolina DPI's STEM Schools of Distinction Recognition Program

Much like the National Board Certification for Teachers Program, other school recognition programs, or even a college application, the North Carolina STEM Schools of Distinction Recognition Program application expects a school to explain and demonstrate their ideas about STEM education and their qualifications for recognition. The North Carolina STEM School Progress Rubric is not overly prescriptive to allow for local flexibility and control, and the application program invites schools to make the case for why they should be recognized. Applicants are encouraged to provide both a succinct narrative explaining their school's conception or definition of key terms, ideas, or processes in the rubric as well as hard numbers, lists, artifacts, and other evidence of their work and accomplishments.

To address issues related to equity of opportunity for recognition across schools of varying sizes, resources, and other characteristics, a perfect score on the rubric is not required to attain recognition.

Finally, the intent of North Carolina STEM Schools of Distinction Recognition Program is to recognize excellence and inspire others toward it. It is meant to be a rigorous process that is not easily attainable. The process aims to guide schools across the state to grow their STEM education work, to innovate approaches towards the teaching of standards and to inspire students towards becoming prepared and productive members of their community, ready for post-secondary experiences.

More information about the North Carolina STEM Schools of Distinction Recognition Program application process, visit https://www.dpi.nc.gov/districts-schools/classroom-resources/k-12-standards-curriculum-and-instruction/programs-and-initiatives/stem-education-and-leadership/stem-schools-distinction

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North Carolina STEM School Progress Rubric

1. Student Opportunities
1.1 Students Designing
1.2 Students Working in Teams
1.3 Learning Connected to the Real World
1.4 Students Using Digital Technology
1.5 Opportunities with STEM Organizations
2. Classroom Environment
2.1 Instruction Integrating Content
2.2 Varied Learning Approaches
2.3 Multiple Assessment Types
2.4 Teacher Collaboration
2.5 Comprehensive Advising*
3. School Structures
3.1 Professional Learning Focus
3.2 Professional Learning Format and Structure
3.3 Physical Space for Projects
3.4 Strategic Staffing for STEM
3.5 Variety of STEM Courses*
4. School Culture
4.1 STEM Education Plan
4.2 Data-Informed Continuous Improvement
4.3 Vibrant STEM Culture
4.4 Serving Underrepresented Students
5. Community Connections
5.1 STEM Schools Network
5.2 STEM Business Advisory Council
5.3 Communication Strategy

* Applies only to high schools.

(1) Student Opportunities				
	Early	**Developing**	**Prepared**	**Model**
1.1 Students Designing	○ *In the vast majority of STEM-related courses, students rarely have the opportunity* to take the lead in solving a problem or answering a question. This can be done, for example, when students engage in: creating and executing an investigation or experiment; creating and completing a cycle of the engineering design process; or creating and completing a cycle of computational thinking.	○ *At least 1 time per year, in the vast majority of STEM-related courses,* students take the lead in solving a problem or answering a question. This can be done, for example, when students engage in: creating and executing an investigation or experiment; creating and completing a cycle of the engineering design process; or creating and completing a cycle of computational thinking.	○ *At least 2 times per year, in the vast majority of STEM-related courses*, students take the lead in solving a problem or answering a question. This can be done, for example, when students engage in: creating and executing an investigation or experiment; creating and completing a cycle of the engineering design process; or creating and completing a cycle of computational thinking.	○ *At least 3-4 times per year, in the vast majority of STEM-related courses*, students take the lead in solving a problem or answering a question. This can be done, for example, when students engage in: creating and executing an investigation or experiment; creating and completing a cycle of the engineering design process; or creating and completing a cycle of computational thinking.
1.2 Students Working in Teams	○ In at least 75% of STEM-related classes, students *rarely* learn in teams with clearly defined individual and team expectations.	○ In at least 75% of STEM-related classes, students *occasionally* learn in teams with clearly defined individual and team expectations.	○ In at least 75% of STEM-related classes, *once per week* students learn in teams with clearly defined individual and team expectations. The teacher continuously supports the students through the successes and challenges of teamwork.	○ In at least 75% of STEM-related classes, *multiple times per week* students learn in teams with clearly defined individual and team expectations. The teacher continuously supports the students through the successes and challenges of teamwork.
1.3 Learning Connected to the Real World	○ In the vast majority of STEM-related classes, students *rarely have* learning experiences that have explicit connections to current work in STEM-related industries (e.g., learning about current STEM topics, addressing a current real-world problem, using the specific methods and/or tools of STEM professionals). ○ *Most students rarely have any direct experiences* with STEM professionals and/or professional STEM work environments annually; these may include presentations, workshops, field trips, service-learning events, clubs, competitions, summer/afterschool/ weekend programs, apprenticeships,	○ In the vast majority of STEM-related classes, students *rarely* have learning experiences that have explicit connections to current work in STEM-related industries (e.g., learning about current STEM topics, addressing a current real-world problem, using the specific methods and/or tools of STEM professionals). ○ *At least 50% of students have at least one direct experience* with STEM professionals and/or professional STEM work environments annually; these may include presentations, workshops, field trips, service-learning events, clubs, competitions, summer/afterschool/ weekend programs, apprenticeships,	○ In the vast majority of STEM-related classes, students *occasionally* have learning experiences that have explicit connections to current work in STEM-related industries (e.g., learning about current STEM topics, addressing a current real-world problem, using the specific methods and/or tools of STEM professionals). ○ *At least 50% of students have at least two direct experiences* with STEM professionals and/or professional STEM work environments annually; these may include presentations, workshops, field trips, service-learning events, clubs, competitions, summer/afterschool/ weekend programs, apprenticeships,	○ In the vast majority of STEM-related classes, students *frequently* have learning experiences that have explicit connections to current work in STEM-related industries (e.g., learning about current STEM topics, addressing a current real-world problem, using the specific methods and/or tools of STEM professionals). ○ *At least 75% of students have at least two direct experiences* with STEM professionals and/or professional STEM work environments annually; these may include presentations, workshops, field trips, service-learning events, clubs, competitions, summer/afterschool/ weekend programs, apprenticeships,

	internships, etc. that involve 1 or more STEM professionals.	internships, etc. that involve 1 or more STEM professionals.	internships, etc. that involve 1 or more STEM professionals.	internships, etc. that involve 1 or more STEM professionals.
1.4 Students Using Digital Technology	○ At least 75% of all teachers *rarely* provide students with opportunities to identify, evaluate, and use digital tools and resources appropriate for the learning objectives, this includes: opportunities to create; think critically; solve problems; explore relevant issues; communicate ideas; and collaborate. ○ Common digital tools and resources specific to STEM content areas (e.g., spreadsheet applications in biology, analysis software in statistics, and design software in engineering) *are not available.*	○ At least 75% of all teachers provide students *with a few* opportunities to identify, evaluate, and use digital tools and resources appropriate for the learning objectives, this includes: opportunities to create; think critically; solve problems; explore relevant issues; communicate ideas; and collaborate. ○ *Less than half of all teachers of STEM-related content and their students* have access to and use common digital tools and resources specific to STEM content areas (e.g., spreadsheet applications in biology, analysis software in statistics, and design software in engineering).	○ At least 75% of all teachers provide students *with many* opportunities to identify, evaluate, and use digital tools and resources appropriate for the learning objectives, this includes: opportunities to create; think critically; solve problems; explore relevant issues; communicate ideas; and collaborate. ○ *About half of all teachers of STEM-related content and their students* have access to and use common digital tools and resources specific to STEM content areas (e.g., spreadsheet applications in biology, analysis software in statistics, and design software in engineering).	○ At least 75% of all teachers provide students *with regular* opportunities to identify, evaluate, and use digital tools and resources appropriate for the learning objectives, this includes: opportunities to create; think critically; solve problems; explore relevant issues; communicate ideas; and collaborate. ○ *At least 75% of teachers of STEM-related content and their students* have access to and use common digital tools and resources specific to STEM content areas (e.g., spreadsheet applications in biology, analysis software in statistics, and design software in engineering).
1.5 Opportunities with STEM Organizations	○ The school offers *2 or fewer* in-school and out-of-school extracurricular STEM program, this includes clubs, competitions, fairs, STEM nights, internship programs at high schools, etc.	○ The school offers *a few (3)* in-school and out-of-school extracurricular STEM program, this includes clubs, competitions, fairs, STEM nights, internship programs at high schools, etc.	○ The school offers *several (4)* in-school and out-of-school extracurricular STEM program, this includes clubs, competitions, fairs, STEM nights, internship programs at high schools, etc.	○ The school offers *many(5+)* in-school and out-of-school extracurricular STEM program, this includes clubs, competitions, fairs, STEM nights, internship programs at high schools, etc.

(2) Classroom Environment				
	Early	**Developing**	**Prepared**	**Model**
2.1 Instruction Integrating Content	○ At least 75% of all teachers provide *at least one learning opportunity occasionally, or about twice per year,* in which their subject-area is explicitly, intentionally integrated with another subject-area (any subject area – the arts, humanities, other STEM subjects, CTE, etc.), requiring students to organize knowledge across disciplines. A teacher can create this opportunity by themselves, through their lesson plan, or in collaboration with other teachers.	○ The least 75% of all teachers provide *at least one learning opportunity every couple units, or about once every 4-8 weeks*, in which their subject-area is explicitly, intentionally integrated with another subject-area (any subject area – the arts, humanities, other STEM subjects, CTE, etc.), requiring students to organize knowledge across disciplines. A teacher can create this opportunity by themselves, through their lesson plan, or in collaboration with other teachers.	○ At least 75% of all teachers provide *at least one learning opportunity per unit, or about every 2-3 weeks,* in which their subject-area is explicitly, intentionally integrated with another subject-area (any subject area – the arts, humanities, other STEM subjects, CTE, etc.), requiring students to organize knowledge across disciplines. A teacher can create these opportunities by themselves, through their lesson plans, or in collaboration with other teachers.	○ At least 75% of all teachers provide *at least one learning opportunity per week* in which their subject-area is explicitly, intentionally integrated with another subject-area (any subject area – the arts, humanities, other STEM subjects, CTE, etc.), requiring students to organize knowledge across disciplines. A teacher can create these opportunities by themselves, through their lesson plans, or in collaboration with other teachers.
2.2 Varied Learning Approaches	○ At least 75% of non-STEM-related content area teachers rarely implement authentic, relevant, and student-centered/personalized lessons. ○ Less than 50% of STEM-related content area teachers *occasionally use* hands-on or design-based learning opportunities in their classes ○ Students *rarely complete* any projects.	○ At least 75% of non-STEM-related content area teachers implement authentic, relevant, and student-centered/personalized lessons *occasionally*. ○ At least 50% of STEM-related content area teachers *occasionally use* hands-on or design-based learning opportunities in their classes. ○ The vast majority of students *complete at least one project per year,* engaging in project-based learning, *but teachers across multiple subject areas do not collaborate and coordinate*.	○ At least 75% of non-STEM-related content area teachers implement authentic, relevant, and student-centered/personalized lessons *at least once per week*. ○ At least 75% of STEM-related content area teachers *occasionally use* hands-on or design-based learning opportunities in their classes. ○ The vast majority of students *complete at least one project per year in which teachers across at least two subject areas collaborate and coordinate*, engaging students in project-based learning.	○ At least 75% of non-STEM-related content area teachers implement authentic, relevant, and student-centered/personalized lessons *at least twice per week*. ○ At least 75% of STEM-related content area teachers *consistently use* hands-on (including design-based software) learning opportunities in their classes. ○ The vast majority of students complete *at least two projects per year in which teachers across at least two subject areas collaborate and coordinate*, engaging students in project-based learning.

2.3 Multiple Assessment Types	○ Less than 50% of all teachers *occasionally use* multiple and varied assessments to monitor student learning, such as projects, portfolios, performance-based assessments, etc. along with traditional quizzes and tests.	○ At least 50% of all teachers *occasionally use* multiple and varied assessments to monitor student learning, such as projects, portfolios, performance-based assessments, etc. along with traditional quizzes and tests.	○ At least 75% of all teachers *occasionally use* multiple and varied assessments to monitor student learning, such as projects, portfolios, performance-based assessments, etc. along with traditional quizzes and tests.	○ At least 75% of all teachers *consistently use* multiple and varied assessments to monitor student learning, such as projects, portfolios, performance-based assessments, etc. along with traditional quizzes and tests.
2.4 Teacher Collaboration	○ At least 75% of all teachers collaborate with colleagues *rarely* for the specific purpose of designing learning outcomes and instruction that integrate multiple STEM-related and non-STEM-related subject areas.	○ At least 75% of all teachers collaborate with colleagues *a few times per year* for the specific purpose of designing learning outcomes and instruction that integrate multiple STEM-related and non-STEM-related subject areas.	○ At least 75% of all teachers collaborate with colleagues *monthly* for the specific purpose of designing learning outcomes and instruction that integrate multiple STEM-related and non-STEM-related subject areas.	○ At least 75% of all teachers collaborate with colleagues at least *every two weeks* for the specific purpose of designing learning outcomes and instruction that integrate multiple STEM-related and non-STEM-related subject areas.
2.5 Comprehensive Advising *(High School Only)	○ *Both counselors and at least 75% of STEM-related content area teachers rarely have knowledge of* STEM career pathways and ecosystems, as well as the job-searching and postsecondary enrollment process. ○ Counselors and students *rarely have* consistent one-on-one relationships.	○ *Both counselors and at least 75% of STEM-related content area teachers have limited knowledge* of STEM career pathways and ecosystems, as well as the job-searching and postsecondary enrollment process, but *rarely provide formal or informal advising* to students on STEM opportunities. ○ Counselors and students have developed one-on-one relationships and use face-to-face and/or virtual communication *at least once* per year to discuss and plan the alignment of the student's interests to relevant course work, extracurricular opportunities, internships, jobs, and postsecondary education.	○ *Both counselors and at least 75% of STEM-related content area teachers have knowledge of* STEM career pathways and ecosystems, as well as the job-searching and postsecondary enrollment process, and *occasionally provide formal or informal advising* to students on STEM opportunities. ○ Counselors and students have developed one-on-one relationships and use face-to-face and virtual communication *at least twice per year* to discuss and plan the alignment of the student's interests to relevant course work, extracurricular opportunities, internships, jobs, and postsecondary education.	○ *Both counselors and at least 75% of STEM-related content area teachers have knowledge regarding* STEM career pathways and ecosystems, as well as the job-search and postsecondary enrollment process, and *frequently provide formal or informal advising* to students on STEM opportunities. ○ Counselors and students have developed one-on-one relationships and use both face-to-face and virtual communication *at least three times per year* to discuss and plan the alignment of the student's interests to relevant course work, extracurricular opportunities, internships, jobs, and postsecondary education.

<table>
<tr><th colspan="5">(3) School Structures</th></tr>
<tr><th></th><th>Early</th><th>Developing</th><th>Prepared</th><th>Model</th></tr>
<tr>
<td>3.1 Professional Learning Focus</td>
<td>○ Time, support, and resources for professional learning on 1 of the following topics is available to all STEM-related content area teachers. This is not limited to professional learning that is a recognized CEU.
- <u>inquiry-based and problem-based</u> instructional practices that require students to integrate content and design and conduct investigations and experiments and analyze results
- <u>connecting instructional content to real-world problems</u> and career pathways
- teaching students <u>design-based thinking</u>
- providing opportunities for <u>hands-on learning</u>, including for students to handle instruments to gather data, engage with the natural environment, and manipulate physical objects

○ Professional learning that provides STEM-related content area teachers with support to grow their own content knowledge in the constantly accelerating fields of science, technology, engineering, and others (for example, teachers have time to learn about the recent developments in the genetics field or in agricultural sciences), is not available.</td>
<td>○ Time, support, and resources for professional learning on 2 of the following topics is available to all STEM-related content area teachers. This is not limited to professional learning that is a recognized CEU.
- <u>inquiry-based and problem-based</u> instructional practices that require students to integrate content and design and conduct investigations and experiments and analyze results
- <u>connecting instructional content to real-world problems</u> and career pathways
- teaching students <u>design-based thinking</u>
- providing opportunities for <u>hands-on learning</u>, including for students to handle instruments to gather data, engage with the natural environment, and manipulate physical objects

○ Professional learning that provides STEM-related content area teachers with support to grow their own content knowledge in the constantly accelerating fields of science, technology, engineering, and others (for example, teachers have time to learn about the recent developments in the genetics field or in agricultural sciences), is available to a few STEM-related content area teachers.

○ 25-49% of STEM-related content area teachers participate every-other-year in at least one applied learning experience to increase their STEM content or career knowledge (e.g., study trips, fellowships,</td>
<td>○ Time, support, and resources professional learning on 3 of the following topics is available to all STEM-related content area teachers. This is not limited to professional learning that is a recognized CEU.
- <u>inquiry-based and problem-based</u> instructional practices that require students to integrate content and design and conduct investigations and experiments and analyze results
- <u>connecting instructional content to real-world problems</u> and career pathways
- teaching students <u>design-based thinking</u>
- providing opportunities for <u>hands-on learning</u>, including for students to handle instruments to gather data, engage with the natural environment, and manipulate physical objects

○ Professional learning that provides STEM-related content area teachers with support to grow their own content knowledge in the constantly accelerating fields of science, technology, engineering, and others (for example, teachers have time to learn about the recent developments in the genetics field or in agricultural sciences), is available to some STEM-related content area teachers.

○ 50-74% of STEM-related content area teachers participate every-other-year in at least one applied learning experience to increase their STEM content or career knowledge (e.g., study trips, fellowships,</td>
<td>○ Time, support, and resources for professional learning on all 4 of the following topics is available to all STEM-related content area teachers. This is not limited to professional learning that is a recognized CEU.
- <u>inquiry-based and problem-based</u> instructional practices that require students to integrate content and design and conduct investigations and experiments and analyze results
- <u>connecting instructional content to real-world problems</u> and career pathways
- teaching students <u>design-based thinking</u>
- providing opportunities for <u>hands-on learning</u>, including for students to handle instruments to gather data, engage with the natural environment, and manipulate physical objects

○ Time, support, and resources for STEM-related content area teachers to grow their own content knowledge in the constantly accelerating fields of science, technology, engineering, and others (for example, teachers have time to learn about the recent developments in the genetics field or in agricultural sciences), is available to all STEM-related content area teachers.

○ Over 75% of STEM-related content area teachers participate every-other-year in at least one applied learning experience to increase their STEM content or career knowledge (e.g., study trips, fellowships,</td>
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		internships, etc. with a duration of 1 day to 1 year).	internships, etc. with a duration of 1 day to 1 year).	internships, etc. with a duration of 1 day to 1 year).
3.2 Professional Learning Format and Structure	○ The majority of professional learning for STEM education is designed to address *large group needs as determined by school goals or initiatives.* ○ *Less than 50% of teachers experience at least 1 of these forms* of job-embedded professional learning annually: peer observation, lesson study, critical friends feedback, coaching, modeling, action research, and/or mentoring. ○ *Administrators rarely participate* in professional learning on STEM education.	○ The majority of professional learning for STEM education is designed to address *large group needs identified through perceptions of school leaders.* ○ *At least 50% of teachers experience at least 1 of these forms* of job-embedded professional learning annually: peer observation, lesson study, critical friends feedback, coaching, modeling, action research, and/or mentoring. ○ *Some administrators* participate in professional learning *on STEM education leadership.*	○ The majority of professional learning for STEM education is designed to address *large group needs identified through data* (e.g., surveys, teacher evaluations, classroom walk-throughs). ○ *All teachers experience at least 1 of these forms* of job-embedded professional learning annually: peer observation, lesson study, critical friends feedback, coaching, modeling, action research, and/or mentoring. ○ *Some administrators* participate in professional learning *on STEM education instruction and/or STEM education leadership.*	○ The majority of professional learning for STEM education *is personalized based on participants' self-identified professional learning needs as well as through secondary data* (e.g., surveys, evaluations, classroom walk-throughs, etc.). ○ *All teachers experience at least 2 of these forms* of job-embedded professional learning annually: peer observation, lesson study, critical friends feedback, coaching, modeling, action research, and/or mentoring. ○ *All administrators* participate in professional learning *on STEM education instruction and/or STEM education leadership.*
3.3 Physical Space for Projects	○ *On special occasions computer labs or classrooms are transformed* into spaces and project work areas for face-to-face or virtual collaboration among students and teachers, or to be used as exhibition spaces. ○ The arrangement of STEM classrooms *does not support* individual work and *group work* and the vast majority of STEM-related content area teachers *cannot change* the arrangement to meet instructional needs.	○ *One or more facilities or spaces (this may include a classroom) are occasionally transformed* into project work areas for face-to-face or virtual collaboration among students and teachers, or to be used as exhibition spaces. ○ The arrangement of STEM classrooms *can support* individual work and *group work* and the vast majority of STEM-related content area teachers *rarely* change the arrangement to meet instructional needs.	○ *One or more facilities or spaces (this may include a classroom) are frequently transformed* into project work areas for face-to-face or virtual collaboration among students and teachers, or to be used as exhibition spaces. ○ The arrangement of STEM classrooms *can support* individual work *and various group work* and the vast majority of STEM-related content area teachers *occasionally* change the arrangement to meet instructional needs.	○ *One or more facilities or spaces are consistently available specifically for* students to collaborate and do project work, such as a STEM lab; the spaces can be used for face-to-face or virtual collaboration among students and teachers; they can be used as exhibition spaces. ○ The arrangement of STEM classrooms *can support* individual work and *various group work*; the vast majority of STEM-related content area teachers *regularly* change the arrangement to meet instructional needs.

3.4 Strategic Staffing for STEM	○ The school does not yet have a STEM Education leader who is not an administrator. ○ *The school rarely makes STEM instructional skills or awareness a requirement or priority* for teaching positions. ○ The school *rarely identifies teacher-leaders* for STEM education.	○ The school has at least one STEM Education leader who is not an administrator, but who has no time allocated to leading STEM education. ○ The school recruits, hires, and/or develops *a few teachers* on their faculty to have high quality STEM instructional skills (for STEM subject teachers) or rich understanding of the positive relationship between STEM subjects and all other subjects (non-STEM subject teachers). ○ The school has *informal pathways to identify current teacher-leaders* for STEM education.	○ The school has at least one STEM Education leader who is not an administrator *and has at least 25% of their time allocated* to leading STEM education. ○ The school recruits, hires, and/or develops *many teachers* on their faculty to have high quality STEM instructional skills (for STEM subject teachers) or rich understanding of the positive relationship between STEM subjects and all other subjects (non-STEM subject teachers). ○ The school has *informal pathways to identify and develop current and future teacher-leaders* for STEM education.	○ The school has at least one STEM Education leader who is not an administrator *and has at least 50% of their time allocated* to leading STEM education. ○ The school recruits, hires, and/or trains *the vast majority of teachers* on their faculty to have high quality STEM instructional skills (for STEM subject teachers) or rich understanding of the positive relationship between STEM subjects and all other subjects (non-STEM subject teachers). ○ The school has *formal pathways to identify and develop current and future teacher-leaders* for STEM education.
3.5 Variety of STEM Courses *(High School Only)	○ Courses in STEM fields (not including traditional core subjects) *are not available* to students face-to-face and/or virtually. ○ *The school rarely offers courses* in STEM fields that provide postsecondary credit. ○ *The school rarely provides access for students to acquire any* industry certifications and/or credentials by graduation.	○ *Courses in 3-4 STEM fields* (not including traditional core subjects) are available to students both face-to-face and/or virtually. ○ *The school offers 1 course* in a STEM field that provides postsecondary credit, based upon agreements with a postsecondary institution(s). ○ *The school provides access for students to acquire a few* industry certifications and/or credentials by graduation.	○ *Courses in 5-6 STEM fields* (not including traditional core subjects) are available to students both face-to-face and/or virtually. ○ *The school offers a few courses* in STEM fields that provide postsecondary credit, based upon agreements with a postsecondary institution(s). ○ *The school provides education, training, support, and access for students to acquire a few* industry certifications and/or credentials by graduation.	○ *Courses in 7 or more STEM fields* (not including traditional core subjects) are available to students both face-to-face and/or virtually. ○ *The school offers several courses* in STEM fields that provide postsecondary credit, based upon agreements with a postsecondary institution(s). ○ *The school provides education, training, support, and access for students to acquire a variety* of industry certifications and/or credentials by graduation.

(4) School Culture				
	Early	**Developing**	**Prepared**	**Model**
4.1 STEM Education Plan	○ A school leadership team is in the process of crafting a STEM Education Plan within the School Improvement Plan. ○ A school leadership team is in the process of building an advisory council that can provide input on STEM education topics ○ A school leadership team is in the process of crafting sustainability plans.	○ A school leadership team has crafted a STEM Education Plan within the School Improvement Plan. *It superficially addresses the 5 Overarching Principles of the NC STEM School Progress Rubric*. ○ In the creation of the STEM Education Plan within the School Improvement Plan, input and buy-in was gained from an advisory council *of at least one student, teacher, and administrator.* ○ The STEM Education Plan within the School Improvement Plan *does not include sustainability planning.*	○ A school leadership team has crafted a STEM Education Plan within the School Improvement Plan. *It adequately addresses the 5 Overarching Principles of the NC STEM School Progress Rubric*. ○ In the creation of the STEM Education Plan within the School Improvement Plan, input and buy-in was gained from an advisory council *of at least one student, teacher, administrator, parent, and business/industry professional.* ○ The STEM Education Plan within the School Improvement Plan contains specific sustainability plans to maintain STEM Education *for at least the next 2 years.*	○ A school leadership team has crafted a robust STEM Education Plan within the School Improvement Plan. *The STEM Education Plan documents realistic and creative strategies, near-term outcomes, and an ultimate vision. It thoroughly addresses the 5 Overarching Principles of the NC STEM School Progress Rubric.* ○ In the creation of the STEM Education Plan within the School Improvement Plan, input and buy-in was gained from an advisory council *of more then one student, teacher, administrator, parent, business/industry professional, and (community college/college/university professional)* *(High School). ○ The STEM Education Plan within the School Improvement Plan contains specific sustainability plans to maintain STEM Education *for at least the next 3-5 years.*
4.2 Data-Informed Continuous Improvement	○ *Sources of data tracking/measuring the STEM Education Plan are rarely* collected and analyzed. ○ *Results of data measuring the STEM Education Plan are not used in making adjustments to improve school performance.* ○ The faculty, administrators, students, and school stakeholders *have rarely discussed building a school culture* in which all understand and agree that measures of student learning/growth are important, in addition to measures of student achievement.	○ *Only high-level sources of data* for tracking/measuring the STEM Education Plan (e.g., student grades and test scores) are being collected and analyzed. ○ Results from the high-level sources of data are analyzed but *rarely used to adjust any activities or near-term outcomes* to continuously improve the school's performance. ○ The faculty, administrators, students, and school stakeholders *are just beginning to build a school culture* in which all understand and agree that measures of student learning/growth are important,	○ *High-level sources of data* for tracking/measuring the strategies and outcomes of the STEM Education Plan (e.g., student grades and test scores) *and one source of more nuanced and informative data* (e.g., student performance data, classroom observation data, web analytics, student participation tracking, etc.) are being collected and analyzed. ○ Based on results of ongoing data collection, *the STEM Education Plan activities and/or near-term outcomes are adjusted about every two years* to continuously improve the school's performance (e.g., adjusting professional development offerings,	○ *Multiple and varied sources of data* for tracking/measuring the strategies and outcomes of the STEM Education Plan (e.g. student performance data, classroom observation data, web analytics, student participation tracking, teacher participation tracking, survey data, test scores, interviews, etc.) are being collected and analyzed. ○ Based on results of ongoing data collection, *the STEM Education Plan activities and/or near-term outcomes are adjusted at least annually* to continuously improve the school's performance (e.g., adjusting professional development

	○ *School leadership rarely encourage or support* the use of teacher-created formative and summative assessments to measure student learning/growth throughout the year.	in addition to measures of student achievement. ○ *School leadership encourages* the use of teacher-created formative and summative assessments to measure student learning/growth throughout the year.	changing schedules, acquiring new materials, increasing goals for student participation in STEM clubs, accelerating goals for student learning/growth, etc.). ○ The faculty, administrators, students, and school stakeholders *are in the middle of building a school culture* in which all understand and agree that measures of student learning/growth are important, in addition to measures of student achievement. ○ *School leadership encourages and supports with dedicated resources* the use of teacher-created formative and summative assessments to measure student learning/growth throughout the year.	offerings, changing schedules, acquiring new materials, increasing goals for student participation in STEM clubs, accelerating goals for student learning/growth, etc.). ○ *A school culture exists* in which faculty, administrators, students, and school stakeholders understand and agree that measures of student learning/growth are important, in addition to measures of student achievement. ○ *School leadership consistently prioritizes and supports with dedicated resources* the use of teacher-created formative and summative assessments to measure student learning/growth throughout the year.
4.3 Vibrant STEM Culture	○ The faculty, administrators, students, and school stakeholders *have rarely discussed building a school culture* in which innovation in STEM by students is consistently honored, encouraged, and incentivized. ○ The administrators and faculty *have rarely discussed building a school culture* in which all faculty feel supported in taking instructional risks and trying new approaches for the benefit of student learning. ○ The faculty, administrators, students, and school stakeholders *have rarely discussed building a school culture* in which high-quality student work in STEM is consistently celebrated. ○ *There is no consistent effort* by school leaders *to communicate about STEM education to teachers and students*. ○ School leadership *rarely promotes a vision for STEM education*.	○ The faculty, administrators, students, and school stakeholders *are just beginning to build a school culture* in which innovation in STEM by students is consistently honored, encouraged, and incentivized. ○ The administrators and faculty *are just beginning to build a school culture* in which all faculty feel supported in taking instructional risks and trying new approaches for the benefit of student learning. ○ The faculty, administrators, students, and school stakeholders *are just beginning to build a school culture* in which high-quality student work in STEM is consistently celebrated. ○ *Weekly* school leaders communicate *about STEM education to teachers and students*. ○ School leadership *annually* promotes the vision for STEM education *to faculty and staff*.	○ The faculty, administrators, students, and school stakeholders *are in the middle of building a school culture* in which innovation in STEM by students is consistently honored, encouraged, and incentivized. ○ The administrators and faculty *are in the middle of building a school culture* in which all faculty feel supported in taking instructional risks and trying new approaches for the benefit of student learning. ○ The faculty, administrators, students, and school stakeholders *are in the middle of building a school culture* in which high-quality student work in STEM is consistently celebrated. ○ *In daily interactions* school leaders *communicate about STEM education to teachers and students*. ○ School leadership *occasionally* promotes the vision for STEM education *to all stakeholders, including faculty, staff, students, parents, partners, and community members*.	○ *A school culture exists* in which all faculty, administrators, students, and school stakeholders consistently honor, encourage, and incentivize innovation in STEM by students. ○ *A school culture exists* in which all faculty feel supported in taking instructional risks and trying new approaches for the benefit of student learning. ○ *A school culture exists* in which all faculty, administrators, students, and school stakeholders consistently celebrate high-quality student work in STEM; this includes in ongoing school wide exhibits onsite, online, and/or in state or national forums. ○ *In daily interactions* school leaders *serve as lead teachers and learners for STEM education, explicitly modeling inquiry, critical-thinking, and problem-solving.* ○ School leadership *frequently* promotes the vision for STEM education *to all stakeholders, including faculty, staff,*

				students, parents, partners, and community members.
4.4 Serving Underrepresented Students	○ The faculty, administrators, students, and school stakeholders *have rarely discussed building* a general culture of inquiry and creativity throughout the school, in STEM-related and non-STEM-related subjects, that intentionally includes every single student and makes explicit efforts to include students from groups historically underrepresented in the STEM education pipeline. ○ *The school rarely carries out intentional practices* focused on increasing long-term participation by students from underrepresented groups in the STEM education pipeline (e.g., provides targeted professional learning, provides mentors, offers targeted clubs or activities, disaggregates school data by a variety of sub-groups, etc.).	○ The faculty, administrators, students, and school stakeholders *are just beginning to build* a general culture of inquiry and creativity throughout the school, in STEM-related and non-STEM-related subjects, that intentionally includes every single student and makes explicit efforts to include students from groups historically underrepresented in the STEM education pipeline. ○ *The school carries out at least 1 intentional practice* focused on increasing long-term participation by students from underrepresented groups in the STEM education pipeline (e.g., provides targeted professional learning, provides mentors, offers targeted clubs or activities, disaggregates school data by a variety of sub-groups, etc.).	○ The faculty, administrators, students, and school stakeholders *are in the middle of building a* general culture of inquiry and creativity throughout the school, in STEM-related and non-STEM-related subjects, that intentionally includes every single student and makes explicit efforts to include students from groups historically underrepresented in the STEM education pipeline. ○ *The school carries out at least 2 intentional practices* focused on increasing long-term participation by students from underrepresented groups in the STEM education pipeline (e.g., provides targeted professional learning, provides mentors, offers targeted clubs or activities, disaggregates school data by a variety of sub-groups, etc.).	○ A general culture of inquiry and creativity that intentionally includes every single student *exists throughout the school, in STEM-related and non-STEM-related subjects,* with explicit efforts to include students from groups historically underrepresented in the STEM education pipeline. ○ *The school carries out several intentional practices* focused on increasing long-term participation by students from groups historically underrepresented in the STEM education pipeline (e.g., provides targeted professional learning, provides mentors, offers targeted clubs or activities, disaggregates school data by a variety of sub-groups, etc.).

(5) Community Connection				
	Early	**Developing**	**Prepared**	**Model**
5.1 STEM Schools Network	○ The school *rarely connects to other STEM-focused schools across North Carolina.* ○ The school leadership *rarely follows online* other STEM-focused schools and/or STEM-focused school networks outside of North Carolina.	○ The school has direct connections to other STEM-focused schools across North Carolina and uses these connections to exchange successes and challenges in virtual settings, *but rarely meets with these schools face-to-face.* ○ The school leadership *rarely follows online* other STEM-focused schools and/or STEM-focused school networks outside of North Carolina, learning about other schools' successes and challenges by reading online posts.	○ The school has direct relationships with other STEM-focused schools across North Carolina and uses these connections to exchange successes and challenges in face-to-face events, not including conferences, *once per year* (school visits, working meetings, shared professional development, etc.). ○ The school leadership *frequently follows online* other STEM-focused schools and/or STEM-focused school networks outside of North Carolina, learning about other schools' successes and challenges by reading online posts.	○ The school has direct relationships with other STEM-focused schools across North Carolina and uses these connections to exchange successes and challenges in face-to-face events, not including conferences, *at least twice per year* (school visits, working meetings, shared professional development, etc.). ○ The school leadership *has direct, online relationships* with other STEM-focused schools and/or STEM-focused school networks outside of North Carolina and *uses these connections to exchange successes and challenges at least once per year (e.g., school leaders participate in online network, school leaders attend national meeting, direct communication with other school leaders, etc.).*
5.2 STEM Business Advisory Council	○ *The school leadership rarely makes informal connections* with multiple local or regional STEM industry organizations.	○ *The school leadership has informal connections* with multiple local or regional STEM industry organizations.	○ *The school has a business advisory council* with representatives from multiple local or regional STEM industry organizations *that meets at least once per year* to provide advice and feedback on school STEM education activities.	○ *The school has a business advisory council* with representatives from multiple local or regional STEM industry organizations *that meets at least twice per year* to provide advice and feedback on school STEM education activities.

5.3 Communication Strategy	○ One-way communication tools (e.g., websites, newsletters) and/or two-way tools (e.g., social media platforms, webinars, and meetings) *are rarely used* to communicate internally and externally about STEM education activities.	○ One-way communication tools (e.g., websites, newsletters) and/or two-way tools (e.g., social media platforms, webinars, and meetings) *are used annually* to communicate internally and externally about STEM education activities.	○ One-way communication tools (e.g., websites, newsletters) and/or two-way tools (e.g., social media platforms, webinars, and meetings) *are used semiannually* to communicate internally and externally about STEM education activities.	○ One-way communication tools (e.g., websites, newsletters) and/or two-way tools (e.g., social media platforms, webinars, and meetings) *are used quarterly* to communicate internally and externally about STEM education activities.

Appendix A. Scoring Sheet

School Name: ___

Date Rubric Completed: ___

Names and/or numbers of school staff completing the rubric:

School administrators/titles: ___

School Lead staff/titles: ___

Teachers: ___

Advisory/Other: ___

Scoring Guide

The STEM Schools of Distinction Designation is awarded at either the "Prepared" or "Model" level of achievement for schools/programs that apply and that satisfactorily demonstrate the criteria established according to the North Carolina STEM School Progress Rubric. Schools/programs that self-assess at the "Early" and "Developing" levels of achievement should utilize the indicators as a roadmap for reaching the next levels.

*The intention of the STEM Schools of Distinction recognition program is to evaluate and recognize only those schools/programs who self-assess at either the **Prepared** or **Model** levels of achievement.*

To make the scoring system most effective, the following rule should be used:

Utilizing the ***STEM School Progress Rubric,*** for each Key Element, all quality indicators (bullets) within a particular cell should be able to be marked as "achieved" for a school to give itself the particular ranking assigned to that cell (Early, Developing, Prepared, or Model). For example, if the school has achieved only two of the three bullets listed in the "Prepared" cell, then the school should rank itself as "Developing". The school can rank itself as Prepared once it has achieved all three indicators listed.

Enter the identified ranking and score in the boxes beside each Key Element. Calculate the overall score (sum) and your average score (divide your sum by the number of Key Elements) for each Overarching Principle.

K-8: Do not include High School Key Elements 2.5 and 3.5 in your calculations

Early = 1 Developing = 2 Prepared = 3 Model = 4

(1) Student Opportunities	Rank	Score
1.1 Students Designing		
1.2 Students Working in Teams		
1.3 Learning Connected to the Real World		
1.4 Students Using Digital Technology		
1.5 Opportunities with STEM Organizations		
Overall Score		
Average Score		

(2) Classroom Environment	Rank	Score
2.1 Instruction Integrating Content		
2.2 Varied Learning Approaches		
2.3 Multiple Assessment Types		
2.4 Teacher Collaboration		
2.5 Comprehensive Advising *(High School Only)		
Overall Score		
Average Score		

(3) School Structures	Rank	Score
3.1 Professional Learning Focus		
3.2 Professional Learning Format and Structure		
3.3 Physical Space for Projects		
3.4 Strategic Staffing for STEM		
3.5 Variety of STEM Courses *(High School Only)		
Overall Score		
Average Score		

(4) School Culture	Rank	Score
4.1 STEM Education Plan		
4.2 Data-Informed Continuous Improvement		
4.3 Vibrant STEM Culture		
4.4 Serving Underrepresented Students		
Overall Score		
Average Score		

(5) Community Connections	Rank	Score
5.1 STEM Schools Network		
5.2 STEM Business Advisory Council		
5.3 Communication Strategy		
Overall Score		
Average Score		

State level review teams will evaluate application submissions. Narratives and artifacts will be required as support for each Key Element. Reviewers will rank each Key Element based on the application information provided. To receive recognition, the following criteria must be met: to qualify for a site-visit the scores must be as follows:

- Prepared Designation
  - No score of Early on any Key Elements
  - No more than one (1) Key Element ranked Developing per Overarching Principle
  - Each Overarching Principle must have an average equal to or above 3.0

- Model Designation
  - No score of Early or Developing on any Key Elements
  - Each Overarching Principle must have an average equal to or above a 3.6

Appendix B. Descriptions of Terms

Rubric Term	Description
Applied Learning	Teachers engaged in direct application of skills, theories, and knowledge. 'Learning by doing' including demonstrating application of knowledge to real-life situations. May include study trips, fellowships, internships, etc. with a duration of 1 day to 1 year.
Collaboration	Students: demonstrate ability to work effectively and respectfully with diverse teams; exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal; assume shared responsibility for collaborative work; and value the individual contributions made by each team member *(adapted from p21.org).*
Communication	Students: articulate thoughts and ideas effectively using oral, written, and nonverbal communication skills in a variety of forms and contexts; listen effectively to decipher meaning, including knowledge, values, attitudes and intentions; use communication for a range of purposes (e.g., to inform, instruct, motivate and persuade); use multiple media and technologies, and know how to judge their effectiveness and assess their impact; and communicate effectively in diverse environments *(adapted from p21.org).*
Computational thinking	Computational thinking (CT) is a problem-solving process that includes (but is not limited to) the following characteristics: formulating problems in a way that enables us to use a computer and other tools to help solve them; logically organizing and analyzing data; representing data through abstractions such as models and simulations; automating solutions through algorithmic thinking (a series of ordered steps); identifying, analyzing, and implementing possible solutions with the goal of achieving the most efficient and effective combination of steps and resources; and generalizing and transferring this problem solving process to a wide variety of problems. These skills are supported and enhanced by a number of dispositions or attitudes that are essential dimensions of CT. These dispositions or attitudes include: confidence in dealing with complexity; persistence in working with difficult problems; tolerance for ambiguity; the ability to deal with open ended problems; and the ability to communicate and work with others to achieve a common goal or solution (from the International Society for Technology in Education (ISTE)'s Computational Thinking Toolkit at https://www.iste.org/explore/articledetail?articleid=152).
Creativity	Students: think creatively, using a wide range of idea creation techniques like brainstorming, creating new and worthwhile ideas, and elaborating, evaluating, and refining their ideas; work creatively with others by developing and communicating new ideas with others, being open to diverse perspectives, incorporating feedback, viewing failure as an opportunity to learn, understanding creativity as a cyclical process; and implement innovations by acting on creative ideas to make a tangible and useful contribution *(adapted from p21.org).*

Rubric Term	Description
Critical thinking	Students: use various types of reasoning, like inductive, deductive, etc., as appropriate to the situation; use systems thinking by analyzing how parts of a whole interact with each other to produce overall outcomes; make judgements and decisions by effectively analyzing and evaluating evidence, arguments, claims and beliefs, synthesizing and making connections between information and arguments, and reflecting critically on learning experiences; and solve different kinds of non-familiar problems in both conventional and innovative ways, asking significant questions that clarify various points of view and lead to better solutions *(adapted from p21.org).*
Digital learning	Any instructional practice that effectively uses digital technology to strengthen a student's learning experience; it includes a focus on the following instructional characteristics: personalized learning; advancement based on mastery of content and competency in application; anywhere and anytime learning; student-centered instruction; digital content; assessments that are integrated into learning activities; and project-based learning activities.
Engineering design process	Engineering is the systematic application of knowledge and experience used to solve a problem. The engineering design process can be defined in many ways. The Engineering is Elementary program at the Museum of Science in Boston has defined the engineering design process for elementary students as the following cyclical set of actions: ask, imagine, plan, create, and improve. The National Aeronautics and Space Administration (NASA) has defined the engineering design process as the following cyclical sets of actions: identify the problem; identify criteria and constraints; brainstorm possible solutions; generate ideas; explore possibilities; select an approach; build a model or prototype; and refine the design.
Formal pathways	Clear, well-developed set(s) of standards, actions, responsibilities, and performance indicators to identify, develop, and recruit teachers into roles and positions of leadership; teachers are aware of the specific tasks and steps outlined for them, particularly those desiring to assume additional responsibilities.
Formative assessment	Formative assessment is a diagnostic process used by teachers and students during instruction that provides feedback to adjust ongoing teaching and learning to improve students' achievement of intended instructional outcomes.
Informal pathways	Unspoken, undocumented, and typically subjective means by which teachers assume additional leadership opportunities and responsibilities; there are no clear standards or metrics for identifying or developing leadership potential.
Job-embedded	Job-embedded professional development refers to teacher learning that is grounded in day-to-day teaching practice and is designed to enhance teachers' content-specific instructional practices with the intent of improving student learning; it is primarily school or classroom based and is integrated into the workday, consisting of teachers assessing and finding solutions for authentic and immediate problems of practice as part of a cycle of continuous improvement *(adapted from Croft, et al., 2010).*

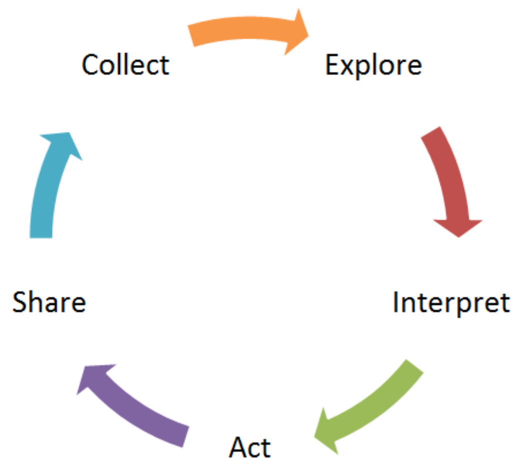
Rubric Term	Description
Makerspaces	A makerspace is a place where students and all individuals present can gather to create, invent, tinker, explore and discover using a variety of tools and materials; they provide a physical laboratory for inquiry-based learning; makerspaces give room and materials for physical learning; these spaces can easily be cross-disciplinary and students can find their work enriched by contributions from others students; students often appreciate the hands-on use of emerging technologies and the opportunity to explore the kind of experimentation that leads to a completed project *(adapted from Educause Education Learning Initiative "7 Things About Makerspaces).*
Multiple and varied assessments	A collection of at least two or more assessments that collectively portray a more complete picture of students' true learning accomplishments and ability, addressing the problem that no one assessment can capture a students' learning or ability; the collection may include portfolios, performance-based assessments, assessments showing mastery, formative assessments, summative assessments, standardized test, etc.
Performance-based assessment	A type of assessment in which students demonstrate the knowledge and skills they have learned; often students are asked to create a product or a response or to perform a specific task or set of tasks; performance-based assessments measure how well students can apply or use what they know, typically in real-world or simulated situations.
Personalized learning	"Personalization refers to instruction that is paced to learning needs, tailored to learning preferences, and tailored to the specific interests of different learners. In an environment that is fully personalized, the learning objectives and content as well as the method and pace may all vary (so personalization encompasses differentiation and individualization)." (From 2010 National Education Technology Plan at https://www.ed.gov/sites/default/files/netp2010.pdf).
Professional learning	High quality professional learning, in most ideal form, is personalized, job-embedded, ongoing, and interactive; *Learning Forward (learningforward.org),* national leader for educator professional development, has outlined 7 standards for professional learning that increases educator effectiveness and results for all students: - occurs within learning communities committed to continuous improvement, collective responsibility, and goal alignment; - requires skillful leaders who develop capacity, advocate, and create support systems for professional learning; - requires prioritizing, monitoring, and coordinating resources for educator learning; - uses a variety of sources and types of student, educator, and system data to plan, assess, and evaluate professional learning; - integrates theories, research, and models of human learning to achieve its intended outcomes; - applies research on change and sustains support for implementation of professional learning for long-term change; and - aligns its outcomes with educator performance and student curriculum standards

Rubric Term	Description
Professional Learning Community (PLC)	The core principals of a high quality PLC are: (1) the PLC's work starts from the assumption that "the core mission of formal education is not simply to ensure that students are taught but to ensure that they learn;" (2) educators in a high quality PLC all "recognize that they must work together to achieve their collective purpose of learning for all, therefore, they create structures to promote a collaborative culture" in their PLC; (3) high quality PLCs "judge their effectiveness on the basis of results, so the focus of team goals shifts from, 'we will adopt the Junior Great Books program' or 'we will create three new labs for our science course,' to 'we will increase the percentage of students who meet the state standard in language arts from 83 percent to 90 percent' or 'we will reduce the failure rate in our course by 50 percent.'" See: DuFour, R. (2004). What is a Professional Learning Community? *Educational Leadership, 61* (8), 6-11.
Project-based learning	A teaching method in which students gain knowledge and skills by working for an extended period of time (potentially as long as 8-12 weeks) to investigate and respond to a complex question, problem, or challenge. *The Buck Institute (bie.org)*, national leader for project-based learning, outlines the following 7 Essential Project Design Elements for Gold Standard PBL: - challenging problem or question - sustained inquiry - authenticity - student voice and choice - reflection - critique and revision - public product The Buck Institute also outlines the following Teaching Practices for Gold Standard PBL: - design and plan - align to standards - build the culture - manage activities - scaffold student learning - assess student learning - engage and coach
School leaders	May include but is not limited to: members of instructional support, e.g. instructional technology facilitator, school library media coordinator, instructional coach, etc.; lead teachers, administrators, School Improvement Team members, and department heads.
Shared vision	Educational leaders bring together stakeholders - faculty, staff, students, parents, community members, etc. – to form a collective, clear picture of what the school (or other organization) aspires to be or become in the future; the leaders also set in motion a process to assess progress toward achieving that vision; the vision will be shared and valued when a process of assessment is in place to provide feedback about the degree to which the vision is being achieved.

Rubric Term	Description
Summative assessment	Cumulative assessments used to measure student learning at the end of an instructional unit, often given at the end of a course to determine the degree to which long term learning goals have been met; summative information can shape how teachers organize their curricula or what courses schools offer their students; common examples include state-mandated tests, district benchmark assessments, end-of-unit tests, and end-of-term exams.
Two-way communication	A process in which two people or groups can communicate reciprocally and exchange ideas; digital platforms with two-way communication allow for both parties to express themselves and receive information from the other.
Underrepresented students in STEM	In North Carolina and nationally groups of students underrepresented in stages of the education and workforce pipeline include female students, students of color, and students from low socio-economic backgrounds.
Vertically aligned	Educational frameworks (practices, content strands, etc.) that are consistently applied across grade-levels with modifications for the developmental level of the students at each grade-level.

Appendix C. Data Interpretation Guide

Analysis for strategic planning is the process of breaking down and examining data to understand project implementation or impact. Before meaningful decisions can be made, it is necessary to understand what data show by manipulating them in thoughtful ways. Analysis bridges the gap between collecting data and interpreting those data for monitoring and adjusting a project. Interpretation, the next phase in strategic planning, is the process of determining “what the data mean”—an important activity between the analysis of data and the making of decisions for next steps.



PHASE	GUIDING QUESTIONS
Explore	• Do your rubric results resonate? • Any surprises? Why? • Any disappointments? Why? • Do you see any correlation or inconsistencies between the rubric results and other data you have? Why do you think this is the case? Identify 3-4 questions that emerge as you review your data …
Interpret	• What do the results mean? How would you summarize the data? • What is working really well in your school? What is not? • What are the critical points or trends you saw in the data? • At your school, who needs to be involved in a discussion about this data? How can you engage teachers and other stakeholders? Document at least 3 takeaways from your review of your data …

Act	• What does this rubric data tell you about efforts you should prioritize now? Next school year? • What changes are you going to make based on this data? • How do these data inform local policy?
	Identify two things you should do based on the data and who in your district should be involved in next steps …
Share	• How should you share your interpretation of the data with staff? Parents? District? School board? • Who should have this information? • How can your data support current or ongoing initiatives in your district? • What is your vision for getting additional input as you go through the planning process?
	Note how and with whom this data should be shared …
Collect	• What local data do you already have available? • What new data do you need to collect? • What about qualitative data? List other data you already have available and additional data that you need …

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