Chapter # 8

BECOMING A STEM FOCUSED SCHOOL: INITIAL PRIORITIES FOR SCHOOL TRANSFORMATION

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ABSTRACT
The global importance of science, technology, engineering, and mathematics (STEM) education is growing, prompting schools and policymakers to seek more effective ways to implement STEM instruction. Ministries of education are responding by creating specialized STEM-focused schools, which aim to cultivate critical thinking, experiential learning, and innovative problem-solving through an integrated, interdisciplinary curriculum. These schools often use project-based learning to connect with real-world applications and prepare a diverse student body, particularly those from underrepresented populations, for STEM careers. However, the implementation of such programs presents challenges. These obstacles can be better overcome with a purposeful pre-implementation framework that addresses key structures and conditions before significant changes are made. This chapter will review existing literature on STEM-focused schools and propose a research-based framework for initial priorities for the transformation to becoming a STEM focused school. This framework will provide teachers, administrators, and policymakers with a clear roadmap for successful school-wide STEM transformation.

Keywords: STEM, STEM education, integrated STEM, project-based learning, school change.

1. INTRODUCTION

STEM focused schools are those designed to prioritize science, technology, engineering, and mathematics as central components of their instructional mission. In the United States as well as across Europe, interest in schools that focus in STEM learning has grown over the past decades (Costello et al., 2020; Eisenhart et al., 2015) driven by repeated calls to strengthen STEM education and by heightened recognition that many future careers depend on continued innovation in science and engineering (National Academies of Sciences, 2024). In the United States, early efforts to define and structure such schools were led by the National Research Council (2011). Several models of STEM focused schools were identified, including inclusive, selective, and Career and technical education-focused schools; each with specific criteria aimed at advancing STEM learning (National Research Council, 2011). Additionally, STEM focused schools are found at all levels of the K-12 system, which means unique affordances can be leveraged to increase the successes of the school but also unique challenges may be present that inhibit their progress as well.

For most schools, transitioning from a traditional school, with traditional blocks of time for each content area, to a STEM focused school is a significant undertaking filled with many questions, uncertainties, and varied infrastructure challenges (Weiselmann et al., 2021). This means that for STEM focused schools to reach the level of quality and success they intend, several criteria must be in place. Some of the more critical criteria include implementing rigorous, integrated STEM curricula, fostering external partnerships with various industry partners in the community, connecting and leveraging expertise from institutions of higher education, and prompting the didactical innovation and critical thinking necessary to support learning across content disciplines. In some contexts and regions in the United States, formal criteria have been developed to formally recognize these STEM focused schools, sometimes referring to them as STEM Designated Schools (Almus, Sahin, & Almus, 2016). Schools that successfully receive this designation typically undergo a thorough and demanding review process that requires the school to demonstrate how it meets the standards and expectations for schools of this nature.

For schools that wish to become a high-quality STEM focused school, even without the formal review process, often involves a substantial and difficult whole-school shift in what they have done before, how they have structured the learning during the day, and the ways in which teachers and teacher leaders collaborate to effectively make this change process viable. Without the foundational knowledge of what the priorities are for implementing this change, especially at the early stages of planning, schools can easily falter. If they are not adequately prepared through the development of essential structures, mindsets, and setting the conditions for change their unintentional lack of understanding can inhibit their progress. That is, if schools fail to understand the broader landscape of becoming a STEM focused school, they will likely fail in their efforts to become such a school. As such, a clearly defined plan of priorities can help school leaders navigate these challenges and better position themselves for the complexity involved. This chapter will detail the initial priorities beginning with the early planning stages and then continuing into the first years of the transition to a STEM focused school.

1.1. Conceptual Framework

Several conceptual frameworks for STEM education (Jackson et al., 2021; Kelley & Knowles, 2016; Roehrig et al., 2021) provide valuable perspectives on how schools might implement integrated STEM. Bybee's (2010) early model outlines a comprehensive ten-year framework for adopting, sustaining, and evaluating integrated STEM education reform through a series of broad, strategic phases. This study specifically pulls from the first two phases: the initial two-year period dedicated to infrastructure, hiring, and curriculum design, followed by a six-year period of active implementation. The core components of Phase 1 include unit development, strategic implementation (selecting specific school district so begin the rollout), and systemic buy-in. Phase II is a six-year scaling period focused on turning initial models into a widespread, permanent standard, including data-driven refinement, policy and standards alignment, curricular shifts, and continuous support. During these stages, the reform relies on continuous reflection and iterative changes to school policy and programming to address emerging challenges. His framework and timeline do not explicitly outline the implementation practices and structures needed to become a STEM focused school. Other scholars have examined particular aspects of STEM implementation or identified individual practices, but their work is not comprehensive in describing the full process or the foundational structures required prior to, and during, the early years of the transition (Slavit et al., 2016; Wieselmann et al., 2021). While existing frameworks provide valuable guidance and insight, a significant gap remains between the general concept of "implementing STEM" and the systematic, structured approach to transitioning from a non-STEM school to a STEM focused institution.

To address this gap, we draw on a broader framework of general school change, Ramhurry's (2024) process and framework for system-wide change in education. We take her description and literature review of the systemic nature of school change, and apply the principles to the context of STEM focused school transformation. Ramhurry describes sustainable system-wide reform as an ongoing, cyclical process categorized into five distinct phases. In Phase One the reform facilitator assesses their preparedness, establishing rapport with leadership to build a foundation. Phase Two is where a core team if influential stakeholders is assembled to develop a shared vision, manage change-related resources, and identify obstacles. In Phase Three, the core team expands into multiple design and decision-making teams, fostering a wider culture of expertise and community liaison. Phase Four is where stakeholders discard outdated practices to design and ideal educational system centered on shared values and administrative support. It is not until Phase Five that the new system is gradually implemented and continually refined through formative assessments and feedback loops. This framework prioritizes a systems-level perspective and rigorous pre-implementation planning. The systems view recognizes that education change must be comprehensive, affecting all interconnected parts of the structure rather than being applied piecemeal. The importance of the multiple pre-implementation steps highlights that foundational phases, such as assessing readiness and assembling core teams are vital because systematic effectiveness depends on having a clear conceptual guide and checklist before execution.

2. BACKGROUND

The concept of a STEM focused school is a relatively recent educational model, gaining initial momentum following the call for improved K-12 STEM education models (National Research Council, 2011). These initial models were broadly categorized as inclusive, selective or technical and career-oriented. The landscape of these schools has since expanded, with various models emerging at all grade levels, including high school (Eisenhart et al., 2015, Erdogan & Stuessy, 2015; Scott, 2012), middle schools (Slavit et al., 2016) and primary schools (House et al., 2020). While these various models share common features, such as an interdisciplinary and real-world focused curriculum, they also exhibit distinct characteristics. These can include the criteria for admission, the use of a makerspace, or a strong focus on Career and Technical Education.

One particularly formalized version of a STEM focused school is the STEM designated school, which is a STEM focused school that has received official recognition after successfully meeting a set of rigorous criteria typically established by a state department of education or an accrediting body. This designation has been officially adopted by a growing number of states in the United States (Öner & Caparo, 2016). As such, this chapter will focus on these officially recognized STEM focused schools.

A review of current research identifies several key characteristics that are essential for the success of a STEM focused school. Wieselmann and colleagues (2021) created a synthesis of critical components adapted from other major studies and their findings towards critical components (Lynch et al., 2018; Peters-Burton et al., 2014; Peters-Burton et al., 2019). While the specific number and range of these features may vary, there is broad agreement on five common components: leadership, curriculum, teaching practices, partnerships, and school culture.

For a STEM focused school to thrive, a supportive administrative team with a clear mission and vision is essential (Wieselmann et al., 2021). Effective leaders are deeply committed to inclusive STEM education and recognize its long-term benefits. These leaders must be prepared to manage the tension, confusion, and other challenges that can arise during a transition to a new school model (Lesseig et al., 2019; Slavit et al., 2016). To address this, they must foster a culture of collaboration, open communication, and mutual respect. Leaders, including teacher leaders (Yow et al., 2021) in successful schools also play a crucial role in enabling teacher autonomy. They proactively consider the needs of teachers, students, and the community through innovative solutions and uplifting leadership. However, Sikma and Osborne (2014) detail some of the conflicts that occur when a top-down mandate for change from the district leadership is taken. Their findings highlighted that a lack of clarity and buy-in among teachers about the purpose of a STEM focused school during the early stages created significant problems, especially in the curriculum design process. Likewise, Trott (2021) found that principals and other stakeholders reported that it took time and professional development to ensure that all members of the school community understood the objectives related to becoming a STEM focused school. For a STEM school to achieve its innovative goals, its leadership needs the autonomy to operate independently from other district mandates.

STEM focused schools typically implement an integrated curriculum, blending science, engineering and mathematics, often in the form of project or problem-based learning. Although the exact definitions and actual implementation of integration can vary (Lesseig et al., 2019), an operational definition that centers on learning that cannot be achieved in a single discipline alone is strongly encouraged (Bennett & Ruchti, 2022). While some schools use professionally developed materials, many create their own (Dallavis, 2023). The quality of these homegrown curricula can vary greatly, which in turn affects the implementation of effective teaching practices. A successful teacher-created integrated curriculum requires teachers to have a deep understanding of science, engineering, and mathematics standards, as well as the pedagogical knowledge to connect these disciplines (Bennett & Ruchti, 2022).

Furthermore, effective STEM focused schools are characterized by instructional practices that are active, research-backed, and designed to immerse students in STEM content, process and habits of mind. Project and problem-based learning, which is typically situated in an authentic context, and emphasizes deeper learning is a key pedagogical approach in STEM Focused schools. For these practices to be successful, teachers must be highly qualified and possess advanced pedagogical content knowledge in STEM and/or practical experience in STEM careers. To support this, teachers in successful STEM schools are provided with opportunities for online professional learning, collaboration, and interactions with STEM education experts and professionals. In addition, these schools use data-driven decision making for continuous improvement. Assessment and data systems are used to inform and refine teaching strategies, student supports, professional learning and the allocation of resources.

Additionally, external partnerships are important for increasing the school's capacity for STEM programming and preparing students for college and career readiness. High-functioning STEM focused schools understand the importance of connecting students with their future careers, building these connections which should be a focus from the primary grades through graduation (Dare et al., 2021). External STEM partnerships with universities, businesses, and industry leaders provide critical support. These connections offer students real-world opportunities and valuable insights into emerging technologies and industry trends, which prepares them for the dynamic demands of STEM careers (Detgen et al., 2021). Additionally, successful STEM schools make sure that the families and community have a voice in the decisions and are included in the school's activities. By establishing and maintaining a strong community presence, emerging STEM schools ensure their initiatives are well-supported and relevant.

Moreover, and of substantial importance, a STEM focused school has a collective school culture that fosters a sense of personal, intellectual, and social-emotional safety. The environment must be built on mutual trust and respect, and maintain high expectations for both students and staff. In this culture, students are given agency and choice in their learning, empowering them to take ownership of their education. Similarly, teachers are granted professional autonomy, allowing them to make choices in their teaching that best serve their students. This balance of high expectations and shared trust creates an environment where students and educators can succeed.

3. CONTEXT AND DESIGN

In this study we wanted to investigate the perceived priorities of educational leaders from STEM-Designated schools regarding the structural, pedagogical, and cultural implementation elements required to transform a traditional school into a STEM-Designated School. The participants in this study were ten educational leaders from STEM-Designated schools from the Mountain-West area of the United States. The educational leaders came from schools with different grade level structures; five of these leaders were from kindergarten through grade six primary schools, two from kindergarten through grade eight schools and two from high schools with the typical grades nine through twelve. All participants had successfully guided their schools through their state's STEM designation process within the past four years. The participants were also members of an established professional leadership group with knowledge of the process. This professional leadership group provided networking opportunities and access to a shared context for on-going professional learning and peer-peer informal mentoring experiences.

An online survey was created and distributed to the participants to gather their perspectives on the implementation priorities for becoming a STEM-Designated School. This survey was developed around multiple research-based sources and other STEM learning outcomes from leading STEM organizations including state standards for STEM designation, core integrated practices from EL Education (2023) and Weiselman's (2021) synthesis of the critical characteristics of STEM focused schools which is grounded in the work of prominent STEM education research (Crotty, 2018; Peters Burton et al., 2020; Peters Burton et al., 2014). The survey was divided into three main sections each addressing a larger element of the change process. Specifically, these elements were centered on school structures and other organizational aspects, pedagogy and active learning, and the overall culture of the school. Each of these sections addresses a critical aspect of becoming a STEM designated school and allows the research team to better capture participants' priorities for a five-year transformation from a traditional school into a STEM focused school. Appendix A outlines the three sections and the specific elements of each section.

In the first section, participants ranked a series of structural and organizational elements according to when each element should become a focus in the transformation process (e.g., in place before beginning the process, Year 1, Year 2, Year 3, Year 4, Year 5, or not important). Broadly speaking, the elements for the first section addressed organizational structures and leadership practices, as well as processes such as scheduling and the curriculum design process. The second section centered on instructional practices. Participants evaluated the importance of various pedagogical goals, including fostering student engagement in problem-solving and project-based learning, promoting cross-curricular integration, incorporating performance-based assessments, and providing professional learning opportunities for staff. The final section asked participants to rank priorities related to school culture, focusing on goals such as family and community engagement, college and career readiness, and technology integration in the classroom. In each section, participants were also invited to provide qualitative comments to further explain their rankings and share additional insights.

4. RESULTS

The results presented in this chapter focus on the initial priorities identified by participants. Specifically, only those priorities considered as the most important either prior to beginning the transformation from a traditional school to a STEM focused school or during the first year of the transformation are discussed below.

With respect to the first element, School Structural and Organizational Elements, the school leaders all indicated three of the sub-elements as being critical. These dealt with having evidence of teacher buy-in, evidence of school leadership buy-in and support, and evidence of district leadership buy-in and support. A fourth, the creation of a STEM leadership team, had strong support with at least seven of the ten agreeing it was a critical early element for success. This suggests that the collective commitments of key stakeholders are necessary from the beginning. Particular importance was given to the buy-in from various stakeholders. Participants highlighted in their comments that a successful transformation from a traditional school to a STEM focus school requires buy-in from teachers, school leadership and district leadership. For example, one leader noted that

> "teachers need to understand what they are getting into, that they will be required to change how they teach, as well as what management looks like when kids are more autonomous; they have to buy into that and leaders need to help them feel supported."

This buy-in cannot be a given; it must be cultivated and supported by leaders and willfully adopted by the teachers and other stakeholders. Overall, the comments suggest that when teachers and school leaders feel supported in the transition, they are more likely to embrace the new model.

With respect to the second element, Pedagogy and Active Learning, there was generally strong support for five of the sub-elements, with common team time and identifying basic evidence of the ideal or intended instructional strategies having the greatest support. Specifically, the qualitative comments highlighted the importance for dedicated and structured time for common planning. The leaders emphasized that this planning time should be established early in the process, ideally before the initiative officially begins. One leader commented,

> "Common planning for both school-wide and grade level is just so much easier to build if done at the earliest stages, even before seeking designation so that you are not trying to face those hurdles with everything else going on. Schedule changes are logistical nightmares."

Whereas another leader stated,

> "When becoming a STEM school, time to develop and coordinate curriculum and instruction is crucial. It is when teachers can collaboratively plan lessons, create assessments and how we ensure consistency across classrooms and grade levels. Without time set aside to do this work, it just cannot get done."

These comments made it clear that without this protected time, the transformation from a traditional school to a STEM focused school may be unsuccessful from the beginning. However, the emphasis on common team and planning, highlights a potential concern. While understanding standards or learning outcomes in mathematics and science was considered important, it was less important than the previous three. This is of particular interest as the three identified as being of slightly greater importance, including the common team and planning time, all rely on a solid understanding of the learning outcomes in order for them to be successful. That is, without a robust knowledge of specific learning outcomes, such as the science and mathematics standards, teams may not be aligned in what they want students to know and be able to do and thus cannot meaningfully discuss how best to support student learning. And while the difference between understanding the standards and the others may be small, the substantial importance of understanding standards and learning outcomes, both at an individual teacher level and at a collective team level, cannot be understated. In fact, one education leader stated,

> "Our professional development wasn't very focused or effective at first. Some teachers understood the science standards, but others didn't, so they couldn't have conversations about the nuances in their planning and curriculum development without having to go back and reteach. I'd make sure all teachers had at least some basic understanding before starting the process."

Also related to the second element, another important priority among leaders was ensuring teachers possess foundational instructional skills and at least a basic understanding of how to create learning experiences aligned to the science and mathematics standards. One leader emphasized that "without the basics, teachers can get overwhelmed in the shift to project-based learning when they don't even have a basic understanding of active learning strategies or the standards that we are building on." Collectively, these perspectives highlight school leaders' priorities in establishing a baseline of instructional strategies and STEM teaching competencies early in the transformation process and how even though some elements and sub-elements may be priorities to the educational leaders, moving on without a team cohesiveness and collective understanding further restricts the school's progress.

Lastly, and with respect to the third element, Culture and Character, which centers on building a strong school culture both within the building and beyond with the greater community, at most, four of the ten participants believed any one sub-element was important. In fact, the highest scoring sub-element was family communication and no more than four participants viewed this as important during either the pre-planning stage or in the initial implementation phase. The overall lack of attention to developing a strong culture around becoming a STEM focused school is perhaps one of the more surprising findings in this study. The research literature is unequivocally clear on the importance of a unified and strong school culture and the role educational leaders play in creating this culture.

5. FUTURE RESEARCH DIRECTIONS

Future research should continue to explore the complexities of successful and unsuccessful school transformations. While we know that the essential role of school and teacher leadership has been established, there is a need to identify the specific leadership practices that are most effective, including a closer examination of how school and district leaders cultivate a culture of innovation, manage resistance to change, and ensure the sustainability of the STEM identity over time, particularly in the face of staff turnover, and shifting resource availability as well as policy and political change.

In addition, research can focus on the specific hurdles schools face after the initial decision to change has been made. For example, a deeper understanding is needed of the most common challenges in defining and integrating the four STEM disciplines and how schools overcome logistical problems, especially in creating schedules that support common planning time. A key area for future inquiry is understanding the specific and critical features of an integrated STEM curriculum and pedagogy that lead to improved student learning outcomes and yet is able to be created and adopted by teachers.

Finally, the role and structure of professional learning in the STEM focused school needs further examination. Instead of simply knowing that it must exist, future studies should explore multiple professional learning models and measure their impact on teacher practice, confidence, professional identity, and student outcomes.

6. DISCUSSION AND CONCLUSION

To begin, school leadership needs to establish a culture and structures conducive to change (Beare et al., 2018; Leithwood et al., 2020; Turan & Bektas, 2013). This includes deliberate attention to common beliefs within the leadership team, consistent and frequent communication around the vision for the school and purpose for change, collaboration with multiple internal and external stakeholders, and an accountability to professional learning. Each of these will be discussed in further detail below.

To successfully transform into a STEM focused school from the beginning of the transformation process, leaders must first establish a culture and structure that is conducive to change. Our findings indicate that educational leaders heavily prioritize this process; securing buy-in from teachers, school leadership, and district leadership from the very beginning matters. This includes creating a clear, comprehensive vision for STEM education that is communicated to and understood by all stakeholders. A clear vision for change is not only necessary, but the first element to clearly define and establish. A comprehensive vision highlighting the benefits of STEM education for students, teachers, and the broader community must be accessible and understandable to all (Grant, 2023). Within that vision and the long-term plan for achieving that vision, measures of success, and how success will be evaluated, including ensuring students from underrepresented populations have equal access should be clearly described. The leadership team should also consider other school initiatives that may not fit the new STEM education vision, and may take away from the vision as this may lead to confusion around purpose and intended outcomes. A critical next step is to form a dedicated STEM Leadership Team composed of teachers and administrators to guide the vision's development and ensure a phased approach to implementation.

Next, the STEM leadership team will need to engage a variety of stakeholders early in the planning process. Building relationships, as well as maintaining open and regular communications, with a variety of stakeholders is critical anytime a major initiative begins (Crotty, 2018). Parents and families are a natural group to include but the STEM leadership team should make deliberate efforts to include community leaders, industry partners, and aligned community organizations from the planning phase onward. These stakeholders bring insights and perspectives not often found within the internal school community and the leadership team should be prepared to leverage these partnerships to enhance learning opportunities, mentorship programs, and access to real-world STEM applications. Additionally, the STEM leadership team should host regular outreach and educational events, such as STEM "Open Houses" to showcase student work and STEM Family Nights to provide hands-on STEM experiences for families, fostering transparency and buy-in. In doing so, informal opportunities to continually educate these external stakeholders are created.

Simultaneously, some internal structures must be adapted or adopted to support the long-term intended change. For example, schools must create schedules to ensure teachers have sufficient common planning time, both within their subject areas and across interdisciplinary teams. Ideally, teams would adopt the Professional Learning Communities structures, as established by DuFour and colleagues (2024), wherein the intentionality of the team is on creating a shared and clear understanding of what they want students to know and be able to do, developing assessment practices to know if this learning occurred, and then how best to support students who did not learn it or how to challenge those who did. Additionally, time should be built into the schedule for regular whole-school professional learning sessions to enhance teacher expertise and promote collaboration (Ruchti et al., 2018). In time, this will lead to teacher-driven professional learning, which further builds the internal professional capacity of the teachers and teacher leaders. Furthermore, schools should consider ways to create flexibility in the daily schedule in order to support interdisciplinary curriculum and instruction, allowing time for collaboration, exploration, reflection, and targeted support. It is worth considering options such as block scheduling, interdisciplinary periods, or advisory time for collaboration and for exhibition days when students showcase their work.

In this study, none of the educational leaders indicated that considering potential financial obligations should be examined in the planning stages, prior to implementation. This is of substantial concern but may be rooted in a belief that expenditures will be similar after the transition. However, the STEM leadership team needs to be clear on the potential financial implications associated with the transition. This includes considering what additional STEM-aligned curricular resources will be needed and when, technology resources, maintenance of the technology, and additional training or professional learning opportunities for teachers and support staff, to instructionally leverage the technologies. Likewise, the team needs to inventory their current technology resources as they may need to invest in, or update, additional classroom technologies such as laptops, tablets, and interactive whiteboards or data collection probes and software. For some schools, it is worth considering whether a dedicated STEM lab or "Makerspace" is needed; each space may need to be designed and equipped for hands-on experimentation and prototyping. Lastly, the STEM leadership team needs to understand the school's internet capacity. In some situations, or geographical locations, the current bandwidth and internet speeds will not support digital tools and online learning. Finally, given the potential initial investment in resources, the STEM leadership team should have a plan for any shifts in resource allocation. That is, by prioritizing technology needs, the leadership team will be better positioned to reallocate financial resources appropriately if or when the situation arises to do so.

Lastly, the STEM leadership team needs to understand how they are going to assess their progress by developing and using appropriate evaluation and continuous improvement tools. To begin, they should define clear measures of success and establish data collection processes to evaluate progress; leveraging the expertise of external stakeholders, such as higher education experts or STEM consultants, is often needed. The STEM leadership team should use this data to inform ongoing adjustments and ensure continuous improvement of STEM initiatives as would be done in a professional learning community (DuFour et al., 2024). However, the team should also use multiple other measures of effectiveness outside of student achievement tests. For example, one common measure of success or goal of STEM focused education is expanding the number of students who pursue advanced degrees and careers in STEM, in particular for women and other underrepresented groups (National Research Council, 2011). Regardless of which measures of success and instruments used to assess this success are used, the intentionality in developing these are necessary.

Although the discussion of this study is on educational leaders' perceived priorities around this pre-implementation framework for becoming a STEM focused school, it is important to remember that this change involves not only curricular modifications and resources. Shifting from a traditional school to a STEM focused school also necessitates a fundamental shift in school culture and operations. One of the foundational considerations is understanding and honoring the unique characteristics of a school and its community; each school operates within a distinct ecosystem of traditions, values, and expectations. Therefore, as schools move forward with this transformation, it must be a dynamic, adaptive process shaped by the unique contexts, histories, and relationships within each school community. Change is never a static event, but is a continuous evolution influenced by real-time interactions and negotiations among stakeholders, including faculty, staff, administrators, and the broader community. Most often, schools must respect and integrate existing traditions while simultaneously fostering innovation. Prioritizing the school's current social and cultural context ensures that implementation is meaningful and sustainable, and also allows for the evolution of practices and the incorporation of community values. By embracing this adaptive and flexible approach, schools can foster a systematic, equitable, and lasting shift toward high-quality STEM education.

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APPENDIX A. Selection of Elements and Sub-elements for Prioritization

School Structural and Organizational Elements
Evidence of teacher buy-in (willingness to take risks, expand content and pedagogical K, etc.)
Evidence of school leadership buy-in and support
Evidence of district leadership buy-in and support
Evidence of parent/guardian buy-in and support
STEM Leadership Team
Project-Based Learning school schedule (adequate time for deeper learning)
Common school-wide teacher planning/development time
Common grade-level/departmental/interdisciplinary team planning time
School-based makerspace
Student-led conferences
Portfolio assessment
Advisories or Homeroom in middle and high school
Standards based grading
Financial resources for PBLs
School STEM Coordinator
Pedagogy and Active Learning Elements
Planning school-wide PBL
Revising school-wide PBL
Documenting school-wide PBL
Teaching and facilitating PBL
Understanding and teaching Idaho Science standards
Understanding and teaching Idaho Mathematics Standards
Curriculum Mapping school-wide PBLs (scope and sequence)
Performance Based Assessments of PBLs or other effective assessment practices
Integrating Engineering into projects, implementing EDP Schoolwide
Integrating reading, writing, and/or arts into projects
incorporating fieldwork, local expertise, partnerships into PBLS
Using sources of data to improve student achievement
Basic evidence based instructional strategies
Classroom management for PBLS
Culture and Character Elements
Defining and implementing a set of character traits (e.g. 4Cs, 21st Century, PBIS,)
Physical environment reflecting STEM focus (e.g. documentation panels, displaying student work)
Family communication and participation in school
Community communication and participation in the school
Systematic College and Career exposure, exploration and advising
Using sources of data to improve student achievement
Instructional coaching allowing for risk-taking
Systematic integration of Engineering Design Process schoolwide
Student mastery of learning shown in portfolios or other non-graded methods
Onboarding teachers new to school
Mentoring teachers new to school