VIRGINIA DEPARTMENT OF EDUCATION

Planning Grant Application for a College Partnership Laboratory School

A. GENERAL INFORMATION

1. **Name of Eligible Entity (Planning Grant Applicant):** New College Institute

2. **Authorized Official Representative:** Christina Reed, 276-403-5602

3. **Name of Contact Person for Application:** Dr. Susheela Shanta

4. **Telephone:** 276-403-5623.

5. **Email:** sshanta@newcollegeinstitute.org

6. **Office Telephone Number:** 276-403-5623

7. **Date of Submission:** October 25, 2022

8. **Amount of Funding Requested ($200,000 maximum):** $175,000

9. Public institutions of higher education (IHE); public higher education centers, institutes, or authorities; or eligible institutions of higher education as defined in the Tuition Assistance Grant Program, as provided in § 23.1-628, (eligible entity or entities) may apply for a Virginia Board of Education (Board) College Partnership Laboratory School Planning Grant (Planning Grant).

10. Each Planning Grant Applicant (applicant) seeking a Planning Grant must read and comply with the Instructions for Application for a Planning Grant for a College Partnership Laboratory School (Lab School), which are available on the Virginia Department of Education's (Department) website, and fully complete this Planning Grant Application (application) to be eligible for a Planning Grant.

11. Applications may be submitted and will be evaluated for Planning Grant awards based on factors set forth herein, on a rolling basis.

12. **Planning Grant Term: This application is for a one-time Planning Grant, the term for which will not exceed 12 months from the date of any award hereunder.**

13. The completed PDF version of the application and related materials must be sent to labschools@doe.virginia.gov by email. The Department may return or reject proposals that are incomplete.

14. Please contact labschools@doe.virginia.gov by email if there are any questions about the application process.

B. DEFINITIONS

1. **College Partnership Laboratory School:** In accordance with Item 4-14 of the General Assembly's 2022-2024 Biennium budget, the Code of Virginia § 22.1-349.1 is amended and reenacted, and the types of IHE eligible entities to establish Lab Schools are defined as follows:

    a. "College Partnership Laboratory School" means a public, nonsectarian, nonreligious school in the Commonwealth established by a public institution of higher education; public higher education center, institute, or authority; or an eligible institution, as defined in § 23.1-628. Notwithstanding the provisions of § 22.1-349.5, a public institution of higher education; a public higher education center, institute, or authority; or an eligible institution, as defined in § 23.1-628 may submit an application for formation of a college partnership laboratory school."

    b. An "eligible institution" as provided above is an institution of higher education as defined in the Tuition Assistance Grant Program in accordance with § 23.1-628.

2. **At-risk student:** As provided in the Code of Virginia § 22.1-349.1, "at-risk student" means a student having a physical, emotional, intellectual, socioeconomic, or cultural risk factor, as defined in Board criteria, that research indicates may negatively influence educational success.

   For the purpose of these guidelines and any Planning Grant awards, "at-risk students" include (a) students who have experienced learning loss as the result of the COVID-19 pandemic; (b) students served by low-performing schools that are designated as "accredited with conditions" or "accreditation denied" based on the Virginia Board of Education's accreditation ratings; and (c) students attending schools identified under the Every Student Succeeds Act within three support categories: (i) Comprehensive Support and Improvement, (ii) Targeted Support and Improvement, or (iii) Additional Targeted Support Category.

3. **Regional diversity:** For the purpose of evaluation of this application, regional diversity reflects representation from each of the Department's eight Superintendent regions.

C. ASSURANCES AND SIGNATURES

1. **ASSURANCES**
   a. By signing and submitting this application, the applicant assures that it will adhere to state and federal laws and regulations governing public schools, including the Virginia *Standards of Quality*, the Virginia *Standards of Learning*, and the Board's *Regulations Establishing Standards for Accrediting Public Schools in Virginia*.

   b. The applicant assures that all elements of the proposed school(s) will comport with all applicable state and federal laws and regulations.

   c. The applicant certifies that to the best of his/her knowledge the information in the application is correct, that all application elements have been addressed as required in this application, and that the applicant understands and will comply with the assurances.

   d. The applicant agrees to conduct a review of their planning phase, and submit milestones and deliverables as required, including, but not limited to, a comprehensive report with details for the projected Lab School implementation, expenses, and other items as may be prescribed by the Department.

e. Applicants receiving a Planning Grant are expected, by the end of the term of such grant, to submit a subsequent application for the launch of a Lab School to the Department, for review and approval by the Board.

f. Applicant provides assurance to subscribe to the following reporting requirements timetable:

TIMELINE	BENCHMARK AND DELIVERABLES
On or before the end of the first quarter of the grant term	Awardee must present a proposed list of milestones, measures of success, and deliverables.
On or before the end of the second quarter of the grant term	Awardee must submit a progress report in order to be eligible for the second installment of the award.
On or before the end of the third quarter of the grant term	Awardee must present progress on milestones and deliverables, including submission to the Board of an application for approval to launch a Lab School.
On or before the end of the grant term	Awardee is expected to have attained approval by the Board to launch a Lab School.

2. SIGNATURES

a. Higher Education Authorization:

Signature of [AUTHORIZED REPRESENTATIVE of public institution of higher education; public higher education center, institute, or authority; or an eligible institution]:

Printed Name: Christina Reed
Title: Director of Finance & Acting Executive Director
Date: October 25, 2022

b. Fiscal Agent Authorization (if applicable): N/A

Signature of Division Superintendent of Fiscal Agent School Division:

Printed Name: Click or tap here to enter text.
Title: Click or tap here to enter text.
Date: Click or tap here to enter text.

c. Signature of Chairman of School Board of Fiscal Agent: N/A

Printed Name: Click or tap here to enter text.
Title: Click or tap here to enter text.
Date: Click or tap here to enter text.

D. REGIONAL AND APPLICANT DIVERSITY

1. Planning Grants will be awarded in a manner that encourages ready access to Lab School options and the establishment of Lab Schools in each of the Department's eight Superintendent regions.

2. Indicate Proposed Name(s) of Lab School: COLLABSCHOOL@ NCI

3. Identify Proposed Physical Location(s) of Lab School:

   New college Institute, 191 Fayette Street, Martinsville, VA 24112

E. PROGRAM DESCRIPTION, GOAL, AND TIMELINE

1. PROGRAM DESCRIPTION

General description of the program *(2-3 paragraphs maximum)*:

NCI plans to provide added opportunities for secondary students from region 6, (which encompasses Carlisle School, Martinsville City, Henry, Patrick, Franklin, Floyd, and Pittsylvania counties), enriching the career pathways for all students. This program will provide more opportunities for students not already participating in the existing CTE programs, Dual Enrollment, and Governor's school curricula. Industry credentialing - using established industry standard exams, internships, or apprenticeship programs, along with career pathways support, will be part of the curriculum to help students pursue workforce opportunities or go on to higher education, with partnering 2- and 4-year colleges.

This planning grant opportunity will allow NCI to establish collaborations and partnerships with school systems, university partners, and consultants to plan out exactly how the COLLABSCHOOL@ NCI will function. NCI will determine what each participating school district needs and how best to provide for those needs during the next 3 to 4 months' time (refer to the planning grant phases), to prepare and submit a Lab School application. Our college partners Longwood University, Virginia Tech, Radford (IMPACT Lab), VCU and others will participate in educator development and other professional development for teachers teaching in the region as well as offer specialized curricula for credentialing.

The program will initially provide options for grades 9 – 12, to focus on the STEM coursework in Agri-Science, Computer Science, Cyber-Security, Health/Healthcare Informatics and Specialized Equipment Maintenance training. In addition, the lab school will expect to have an integrated curriculum every day for students to complete other coursework (Reading, Writing, History, etc.), helping them achieve success in their secondary education. The program will expand in years two & three, based on data and students' needs, to include more coursework, middle school, and homeschooled students. NCI will plan to offer middle schools located in the farthest school systems, synchronous distance-learning, asynchronous instruction, and a potential 5th block of instruction to accommodate the needs of those counties located farthest from NCI. A virtual program through the CSforVA and Virtual Virginia will also be explored to develop better preparedness for students as they progress through high school curricula, where computer science principles and use of key technical software will be ubiquitous and a pre-requisite for workforce readiness or further education.

Rationale for the program *(2-3 paragraphs maximum)*:

New College Institute has a history of providing traditional and innovative education through academic and workforce partnerships that are defined by creative thinking and problem-solving, with the goal of serving the current and future needs of the 21st century workforce. This includes a charge to serve the broader community through K-12 collaborations for facilitated learning to positively impact the secondary to post-secondary pipeline of students to fulfill the region's workforce demands. Current risk-factors in the region include the insufficiencies that exist in the pipeline of K-12 students: Students are not academically qualified for the advanced levels of math and science required for the advanced career-track and college programs. NCI can leverage its

resources of technology and educational equipment, as well as partnerships with other educational institutions, to help with increasing teacher preparedness, adapting to advancing technological innovation and to utilize 21st century instructional technology - helping students develop high level skills that are critical in achieving academic and career success. This will help create an influx of qualified teachers for a region that faces a shortage of teachers.

The data on demographic disparities in Virginia school districts shows that the poverty rate of secondary students in the specific counties NCI proposes to serve ranges from 16% in Franklin County to 30% in Martinsville City (Making the Grade 2021, *Educational Law Center*, Updated Jan. 3, 2022). Furthermore, according to the Learning Policy Research Institute Research Brief (https://learningpolicyinstitute.org/topic/educator-quality), there is a need to invest more quality instructional resources, including highly trained teachers, in students with greater needs and risks. Region 6 is suffering the most from the effects of COVID related learning shortfalls, (often referred to as learning loss), as evidenced by the effects on the economic health of the region through loss of population, joblessness, and lack of new economic engines - small and large businesses. These are interdependent factors for making the region healthy again. NCI, as per its statute in the Code of Virginia, plans to provide high quality secondary education through regional partnerships to improve the bandwidth of the pipeline of students that are career and higher education ready. Coupled with the efforts of the regional Economic Development Corporations (EDCs) and regional Chambers of Commerce, innovative 21st Century K-12 education, which also prepares students for the 5 Cs of the 21st century learning, will provide a better, more comprehensive approach to improving life for our communities and attracting more employers and therefore, growth.

The recently released 2022 SVHSC *Workforce Analysis* prepared by George Mason University's Center for Health Workforce shows that this region (GO Virginia Region 3) between 22 and 34% of the population has a HS Diploma and the median income is below the Virginia median income in all 15 counties in this region. Some of the top requested "hard skills" are computing skills (e.g., database management, Microsoft Office – Excel, Word, PPT, etc.), report writing/report preparation, medical terminology, advanced manufacturing, and electronic health records management, among several other technical skills. This data supports NCI's efforts to offer more opportunities for experiential learning for secondary students who are not already pursuing career tracks and higher education in these fields and creating opportunities for students to pursue careers such as those named above in the COLLABSCHOOL@NCI.

Nature of innovation proposed for the program, including how it will improve student academic proficiency, mastery, college and career readiness, and long-term outcome goal *(2-3 paragraphs maximum):*

The COLLABSCHOOL@NCI will be an innovated learning center that will focus on *experiential learning across the design-based integrative STEM curriculum* (to be vertically integrated – between grades, and laterally as well – between all grade levels). Furthermore, the design-based integrative STEM (I-STEM) education principles (Kelley & Knowles, 2016) will provide opportunities for all students to engage in a research-based, problem-solving mindset to approach all learning (Wells, 2016; Shanta & Wells, 2022). Research has shown that students engaged in design-based learning show better decision-making in real-life challenges (Alton et al. 2018), and students learn that real-life problems need to be solved in an interdisciplinary way and through collaboration with others (De Meester, et al., 2021). A meta-analysis of research (of twenty-eight studies) over the two decades (prior to 2012) has shown that an I-STEM Ed. approach results in significant achievement gains in the core science and math standardized

scores (Becker & Park, 2012). A collaborative atmosphere will encourage students to develop communication skills in a team, where reasoning and discussion will be encouraged and will prepare students to be workforce ready. The COLLABSCHOOL@NCI will utilize the collaborative approach to increase reading comprehension and writing skills as well, thus addressing communication, one of the 5 Cs of the 21st century skills. Students will be accountable to their team members, along with a teacher who is the intentional designer/facilitator of learning and part of the team. The team will be focused on solving challenging real-world problems using grade appropriate disciplinary content and practices (of science, math, computing, design, technology, reading and writing). Cookie-cutter lesson plans will be discouraged, and teachers will be recognized for innovation in instruction. Educators appreciate being allowed the freedom to innovate and improve their work through learning, designing, and assessing.

Three or more career pathways (in health, manufacturing, computing, etc.) will be planned through sequenced courses, culminating in industry credentials that can help students get into apprenticeship programs or count towards coursework at a community college and students could also choose to transition directly into a 4-year university/college into the associated academic/technical program. All the pathways and educational programs will provide foundational computer science education; having that understanding and fluency will become critical over the next decade because of the fast-advancing technologies in every workplace. We expect that we will create short units of 6-to-8-week modules that students will take to cover the age-appropriate fundamentals of computing. This will be repeated at various times to incorporate broad coverage of an understanding of the framework within which all technical computing environments/applications (e. g., CAD, CAM, VR, Gaming, etc.) reside; thus, promoting a deeper understanding of the issues that surround data security and virtual engagement.

Upon integrating the middle school grades and elementary school grades, computing literacy and computer science education will become embedded within the culture of the school, just as reading and writing. Computer Science education will also be part of the pathways for careers and higher education. NCI's partnerships with CodeVA, Radford IMPACT Lab's PACE program, and other higher education institutions will be crucial to our instructional programs' success in this endeavor. NCI's other programs Healthcare and Specialized Advanced Manufacturing Maintenance will also benefit from the underlying foundational computing literacy built into our program.

Alton, E.B., Yamak, H., Kirikkaya, E. B., & Kavak, N., (2018). *Universal Journal of Educational Research 6(12):*2888-2906, 2018 http://www.hrpub.org DOI: 10.13189/ujer.2018.061224

Becker, K. & Park, K. (2012). Effects of integrative approaches among science, technology, engineering, and mathematics (STEM) subjects on students' learning: A preliminary meta-analysis. *Journal of STEM Education*, 12(5&6).

De Meester, J., De Cock, M., Langie, G. and Dehaene, W. (2021). The Process of Designing Integrated STEM Learning Materials: Case Study towards an Evidence-based Model. European *Journal of STEM Education*, 6(1), 10. https://doi.org/10.20897/ejsteme/11341

Kelley, T.R., Knowles, J.G. A conceptual framework for integrated STEM education. *IJ STEM Ed* **3**, 11 (2016). https://doi.org/10.1186/s40594-016-0046-z

Stanovich, P. J. and Stanovich, K. E. (2003). Using research and reason in education: *How teachers can use scientifically based research to make curricular & instructional decisions. Partnership for*

Reading (Project), National Institute for Literacy, US Department of Education. https://doi.org/10.1037/e563842009-001

Shanta, S., Wells, J.G. T/E design-based learning: assessing student critical thinking and problem solving abilities. *Int J Technol Des Educ* **32**, 267–285 (2022). https://doi.org/10.1007/s10798-020-09608-8

Wells, J. & Ernst, J. (2012/2015). Integrative STEM education. Virginia Tech: Invent the Future, School of Education. Retrieved from www.soe.vt.edu/istemed/

Wells, J. (2016) PIRPOSAL Model of Integrative STEM Education: Conceptual and Pedagogical Framework for Classroom Implementation. *Technology and Engineering Teacher* (**March 2016)**, pp. 12-19.

Expected student learning benefits *(2-3 paragraphs maximum):*

As described in the Alton et al. (2018) and the Kelley & Knowles (2016) studies, students' interest and motivation is declining in the STEM fields, while global challenges in climate change, agricultural production, safety - both cyber and physical, energy, water, access to timely and adequate healthcare are all linked to scientific knowledge and technological advances. Preparing our students to tackle these challenges is key to the future health and prosperity of our communities. The two phenomena (students' motivation/interest and need for STEM literacy in future employees) are opposing in their time-lapse graphs (one declining and the other rising). Research shows that students educated in silos, (of disciplinary content), as in the current system of public education, cannot be adequately prepared to tackle real-world (authentic) problems (NAE and NRC, 2014). To prepare students to tackle the real-world, students need to experience integration of the disciplines in the instructional approach, 1) to experience the utilization of the science and math in solving the complex authentic problems, 2) to practice the 5 Cs of the 21st century (communication, collaboration, critical thinking, citizenship – both global and local, and creativity), and develop competence in design thinking (also critical in computational literacy). Interest and motivation are also linked to the disconnect between classroom instruction (lack of authenticity and relevance to their lives) and students' real-world experiences. Repeated exposures to authentic (& relevant) experiential learning and collaborative problem-solving during K-12 educational settings are invaluable to their motivation, interest, and attitudes towards lifelong learning to adapt to workplace advances in technology (NAE & NRC, 2014; NAES, 2021; NCES, 2012).

The COLLABSCHOOL@NCI program is intended to provide students with repeated instances of authentic problem-solving experiences and instruction of contextual (just-in-time) content of science, and mathematics, practices of design thinking and prototyping/testing (technological, engineering, and computational) to solve the problems. Students will approach learning and problem-solving in a collaborative instructional environment which is also a real-world experience where collaboration, critical thinking, communication, and an ability to continue learning are key to achieving success.

The 21st century workplace relies on all the aforementioned skills to achieve success. Students introduced to performing in such an environment will be successful in the workforce which demands transferring their knowledge into real-world practices in the workplace. This is the case for all levels of education. NCI expects to create an innovative school where there will be a continuum of learning and practice - where students experience the relevance of their education and are motivated to engage in their education. Students will be mentored, not only by their teachers, but also by industry professionals,

through our collaborations with employers in the region and worldwide (through in-person and virtual experiences and interactions – again an authentic experience).

National Academy of Engineering (NAE) & National Research Council (NRC) (2014). *STEM integration in K-12 education: Status, prospects, and an agenda.* The National Academies Press. Washington, DC: The National Academy Press.

National Center for Education Statistics (NCES) (2012), U.S. Department of Education - Institute of Education Sciences, Trends in student performance: International trends in average scores. Retrieved on September 24, 2016, from http://nces.ed.gov/surveys/pisa/pisa2012/pisa2012highlights_6a_1.asp

National Academies of Sciences, Engineering, and Medicine (NASEM) 2021. Cultivating Interest and Competencies in Computing: Authentic Experiences and Design Factors. Washington, DC: The National Academies Press. https://doi.org/10.17226/25912.

Expected teacher learning and professional development benefits *(2-3 paragraphs maximum):*

To prepare teachers with the pedagogical tools needed to teach in an integrative STEM education instructional environment, it will be necessary to create opportunities for professional development (PD) and implement a continuum of collaborative learning for the teachers. The COLLABSCHOOL@NCI's instructional design will be based on allowing for planning and learning time for teachers every day. NCI's commitment towards education will be evident in how instructional days are planned for students and teachers alike. The traditional approach to classrooms will not be used in planning the space or designing the learning periods and breaks. Utilizing a block scheduling approach, where instructional units will be created around real-world challenges, teachers will plan their instructional strategies to align their grade level and disciplinary content along with their team of educators, comprising the essential ingredients in our recipe. This methodology will allow for agility in instruction to accommodate advances in technology, knowledge base and the changing workplace demands.

Additionally, educators will be hired on a 11-month contract (rather than the 10-month school year contract) to accommodate a PD institute every year to allow for educators to engage in learning new content or pedagogical tools, as well as participate in research and development of their own design. Teacher self-efficacy and empowerment is key to quality instruction in an I-STEM environment (Havice, W., Havice, P., Waugaman, C., and Walker, K., 2018).

NCI's industry partners, trade organization partners, and higher education institution partners will be involved in providing PD opportunities. Ensuring that educators are treated professionally and provided access to learning and growth, is key to retaining and growing talent. Currently, there is a shortage of educators in Region 6 and nationally due to many educators leaving the field, and there is a decline in the supply of new educators. NCI's partnerships with the higher educational institutions preparing teachers will ensure that pre-service educators are given experiences in their training which will create a commitment and motivation for the educators' pipeline.

Havice, W., Havice, P., Waugaman, C and Walker, P. (2018). Evaluating the Effectiveness of Integrative STEM Education: Teacher and Administrator Professional Development. *Journal of Technology Education. Vol 29(2)* Spring.

Content areas addressed:

As previously mentioned, the instructional pedagogical approach will be integrative STEM education and will engage all students in computing literacy. Within this pedagogical approach we expect to provide pathways of Agri-science and technology (Virginia Tech and https://www.nifa.usda.gov/topics/agriculture-technology), Cybersecurity (Radford IMPACT lab collaboration), Health informatics (https://www.northeastern.edu/graduate/blog/what-is-health-informatics/), and Advanced Manufacturing Systems Technologies (https://www.nist.gov/mep/advanced-manufacturing-technology-servicesindustry-40#:~:text=Advanced%20manufacturing%20technologies%2C%20or%20Industry,artificial%20intelligence%2C%20and%20autonomous%20systems).

NCI will plan to meet DOEs grade level requirements in science and mathematics and the curricular requirement of associated CTE standards for the offered courses. NCI will identify and submit all curricular evidence necessary to the participating school divisions for reporting requirements. Further information and planning will occur during the phase 2.

2. **GOAL**
State the overall proposed goal for the program:

NCI is well-positioned to participate in collaborative and positive community change, promoting **regional economic prosperity and community transformation**.

The COLLABSCHOOL@NCI will provide the best of both, innovative secondary education, and experiential learning for the region's **at-risk and underserved** students through well-designed and -implemented curricula, and academic and workforce partnerships. This lab school's approach will be grounded in creative thinking and problem-solving, with the goal of being responsive to the current and future needs of a well-educated workforce in the community, region and beyond.

3. **TIMELINE**
Provide a timeline of the planning process, including the proposed date/school year for launch of a Lab School:

NCI expects to launch the COLLABSCHOOL@NCI in the Fall of 2023.

The planning phase is expected to be 12 months.

During this time, NCI will also submit the Lab School Application in January or February of 2023.

Phase	Date	Activity
Planning Grant	11/1/2022	Once awarded, contract with consultants
	12/1/2022	Bring consultants in to meet with school systems to begin planning after allowing 2 weeks for research with each school system
	1/25/2022	Review culmination of all information from consultants to develop application
	2/28/2022	Submit application

F. STUDENT POPULATION AND RELEVANT RESEARCH

1. **TARGETED STUDENT POPULATION**
   a. Describe the student population and discuss why they are proposed. Include the number of students, reporting group(s), and grade level(s):

We expect to phase in all grades indicated within the first 3 years.

GRADES TO BE SERVED FOR THE FULL TERM OF THE

APPROVED LAB SCHOOL CONTRACT (PLEASE CHECK ALL THAT APPLY*)			
Pre-K		Sixth Grade	X
Kindergarten	X	Seventh Grade	X
First Grade	X	Eighth Grade	X
Second Grade	X	Ninth Grade	X
Third Grade	X	Tenth Grade	X
Fourth Grade	X	Eleventh Grade	X
Fifth Grade	X	Twelfth Grade	X

*If the applicant intends to add or change grade levels at some point during the Lab School's operation, please provide this information in the education program section of the narrative.

b. Describe the community(ies) the school(s) serves:

The size of the localities of the school systems that NCI is intending to serve is 1,593 miles with a total population of 138,235. The rural area is in Region 6 as identified by the Commonwealth which borders the North Carolina state line. The total cumulative percentage of poverty for this area is 77.1%. As many communities experienced during the NAFTA signing, these localities lost furniture and textile manufacturers, as well as tobacco revenue. Once flourishing communities struggled with the highest unemployment rates in the Commonwealth of Virginia. These issues contributed to the current high percentages of these communities' poverty rates. With the percentages higher than the overall Commonwealth's poverty percentage rate, the effects of poverty carry over into the school environment as well. According to the Children's Bureau (all4kids.org), children raised in impoverished environments tend to attend affected school systems with lower funding availability, have less parental involvement, and have difficulties focusing on school.

c. If the Lab School is going to have a specialized focus (e.g., Science, Technology, Engineering, Mathematics [STEM], at-risk students, special education, career and technical education, gifted education, classical education, etc.), please describe the focus:

Integrative STEM education with experiential learning and authentic problem-based instruction for all students (please see previous narrative). Program description contains this description.

2. RELEVANT RESEARCH

Discuss any relevant research tied to the proposed student population and overall goal of the program to demonstrate that it will improve student academic proficiency, mastery, college and career readiness, and long-term outcomes:

Student benefits and teacher benefits have been described in the narratives before. The associated research documents are provided here as a reference list.

Alton, E.B., Yamak, H., Kirikkaya, E. B., & Kavak, N., (2018). *Universal Journal of Educational Research 6(12):*2888-2906, 2018 http://www.hrpub.org DOI: 10.13189/ujer.2018.061224

Becker, K. & Park, K. (2012). Effects of integrative approaches among science, technology, engineering, and mathematics (STEM) subjects on students' learning: A preliminary meta-analysis. *Journal of STEM Education*, 12(5&6).

De Meester, J., De Cock, M., Langie, G. and Dehaene, W. (2021). The Process of Designing Integrated STEM Learning Materials: Case Study towards an Evidence-based Model. European *Journal of STEM Education*, 6(1), 10. https://doi.org/10.20897/ejsteme/11341

Havice, W., Havince, P., Waugaman, C and Walker, P. (2018). Evaluating the Effectiveness of Integrative STEM Education: Teacher and Administrator Professional Development. *Journal of Technology Education. Vol 29(2)* Spring.

Kelley, T.R., Knowles, J.G. A conceptual framework for integrated STEM education. *IJ STEM Ed* **3**, 11 (2016). https://doi.org/10.1186/s40594-016-0046-z

National Academy of Engineering (NAE) & National Research Council (NRC) (2014). *STEM integration in K-12 education: Status, prospects, and an agenda.* The National Academies Press. Washington, DC: The National Academy Press.

National Center for Education Statistics (NCES) (2012), U.S. Department of Education - Institute of Education Sciences, Trends in student performance: International trends in average scores. Retrieved on September 24, 2016 from http://nces.ed.gov/surveys/pisa/pisa2012/pisa2012highlights_6a_1.asp

National Academies of Sciences, Engineering, and Medicine (NASEM) 2021. Cultivating Interest and Competencies in Computing: Authentic Experiences and Design Factors. Washington, DC: The National Academies Press. https://doi.org/10.17226/25912.

Stanovich, P. J. and Stanovich, K. E. (2003). Using research and reason in education: *How teachers can use scientifically based research to make curricular & instructional decisions. Partnership for Reading (Project)*, National Institute for Literacy, US Department of Education. https://doi.org/10.1037/e563842009-001

Shanta, S., Wells, J.G. T/E design-based learning: assessing student critical thinking and problem solving abilities. *Int J Technol Des Educ* **32**, 267–285 (2022). https://doi.org/10.1007/s10798-020-09608-8

Wells, J. & Ernst, J. (2012/2015). Integrative STEM education. Virginia Tech: Invent the Future, School of Education. Retrieved from www.soe.vt.edu/istemed/

Wells, J. (2016) PIRPOSAL Model of Integrative STEM Education: Conceptual and Pedagogical Framework for Classroom Implementation. *Technology and Engineering Teacher* (**March 2016)**, pp. 12-19.

G. COLLABORATION AND STAKEHOLDER INVOLVEMENT

1. Describe the involvement of local school divisions, community-based organizations, employers, teachers, and parents in the planning, development, and implementation of the proposed program:

   Attached to this planning application are the support letters NCI has obtained from some of the school districts and a few of the educational institutions. The NCI Lab school initiative has also received support letters from the local jurisdictions (Henry County and Martinsville City). Having hosted a regional leadership meeting with the neighboring school districts' leaders, NCI staff solicited feedback and comments/thoughts on what was important to consider during the planning efforts. This work will be continued during the phases of the planning grant period. It is expected that the governing board of the COLLABSCHOOL@NCI will comprise of representatives or leaders from each of the districts that agree to participate, and thus, the fine tuning and planning efforts will be an ongoing effort even after the school is operative. The association of homeschoolers will also be invited to join the effort and NCI will commit to continuing the tradition of serving the community through community engagement at all levels.

   There is a lack of understanding of what this funding provides and how it will impact the school systems' funding. Furthermore, there is also some misinformation of how this will impact existing programs at P&HCC and other CTE programs, and NCI is (and will continue to) working on correcting those misunderstandings. It will take the NCI team through the first and second phase (a few months) to clear up the misinformation and misunderstandings that exist. Therefore NCI is engaging consultants to assist with the planning and expects to phase in the program expansion as well.

   During the planning grant, NCI will seek to collaborate with school divisions to ensure that their issues, concerns, and needs are addressed in the development of the Lab School. The planning grant will also include community meetings for information and participation with community-based organizations, employers, and parents.

2. If the Lab School is going to be in partnership with a local school division(s), please describe the partnership briefly:

   Located in Martinsville, NCI will work towards getting full support from the city school system, however, they have been unable to join the effort because of other ongoing issues about the status of the city as it is striving for a reversion.

   Henry County participates with P&HCC which creates a situation that requires further investigation into ensuring that there is no duplication, thus during phase 2 there will be additional planning and outreach to seek out other avenues to establish a collaborative approach to course development.

   NCI has signed a support letter for the computer science initiative that Franklin County has been involved with and NCI is committed to provide expertise in curriculum development and PD

opportunities for their educators. Franklin County has provided a letter of support to participate in the lab school initiative that NCI is undertaking.

H. SUSTAINABILITY

1. The goal of the Planning Grant program is to support public institutions of higher education; public higher education centers, institutes, or authorities; or eligible institutions of higher education as defined in the Tuition Assistance Grant Program, as defined in § 23.1-628, as they develop and implement programs in order to create or improve capacity to operate and sustain a Lab School independently of long-term state funding, and in a manner that promotes quality, innovation, and program results.

   This planning grant will provide support for NCI, a public higher education center, to successfully develop an implementation plan for a Lab School to be located in Martinsville. It is the intent of the Lab School operating structure to not reduce funding to the participating school systems, but to establish a reasonable funding option with the school divisions to sustain the Lab School. In addition, the Lab School will seek employer support and grant funding support to seek sustainability.

2. **Please describe the capacity of your public institution of higher education; public higher education center, institute, or authority; or eligible institution to implement a Lab School:**

   NCI currently has the capacity to house the Lab School as part of its current facilities. In addition to facilities, NCI also has staffing and established internal structure to implement a Lab School.

   Facilities: NCI has three locations within Martinsville that can be utilized for student learning as part of the Lab School. The first building is the "Building on Baldwin", located at 191 Fayette St. This building is 52,000 square feet and consists of five classrooms on the first floor and five classrooms on the second floor, innovation center, and lecture hall. The lecture hall can allow for larger group activities with open space as needed, while the innovation center houses technology items to allow hands-on experiences for students and visitors. The building is state-of-the-art with technology equipped in each classroom and lecture hall to allow for presentations, video conferences, distance learning, and in-person instruction. Included in the building is a high bay manufacturing facility for hands-on experiences and training opportunities for workforce development. This will be the building for the implementation of the Lab School until growth occurs.

   The next location is the "Fayette Lab" located at 31 Fayette St. This location houses the science lab with the ability to support biology and chemistry needs, as well as healthcare training. In addition to the wet lab, there is one classroom and an additional space that is allocated to the STAG Robotics Team at NCI.

   The final location is "King Hall" located at 30 Franklin St. This building is home to NCI's Testing Center and is the original classroom facility during NCI's establishment in Martinsville. This building is 14,248 square feet of classroom and office space. This building would be utilized and retrofitted to match the technology at Baldwin Building when growth in the Lab School occurs.

Staffing: NCI has staff that are currently qualified with degrees and credentials to teach and participate in the education and hands-on experiential learning activities for the Lab School. In addition to degrees and credentials, staff have the experience of not only providing teaching lessons and training opportunities, but also in the establishment and implementation of a Governor's School.

Internal Structure: NCI has the internal structure for support of a Lab School through Finance, Operations, and Academic Support. Plans that have been created can easily be updated to account for various scenarios for school-aged children. Those plans include Emergency Response, IT Storage, IT access, Building entry, etc. NCI partners with various university partners for delivery of degree programs at NCI and will be able for leverage and support in the delivery of the Lab School.

3. Identify potential affiliates, partners, and describe potential sustainable funding sources:

Potential partners in this initiative include Martinsville City Public Schools, Henry County Public Schools, Carlisle School, Patrick County Public Schools, Franklin County Public Schools, Homeschool Co-ops, Patrick & Henry Community College, City of Martinsville, County of Henry, Radford IMPACT, Virginia Tech STEM Research Center, Longwood University, Virginia Commonwealth University, and CODE VA. These partners will provide educational support and potential funding support. The formation of the Lab School will determine the type of support provided by the school divisions toward sustainability.

NCI also has a supporting foundation that's purpose is to support the endeavors of NCI. Whereas they typically only provide funding for scholarships or programs to support the delivery of a 4-year degree, they would have the ability to perform the fiscal sponsor/agent role for any grant opportunities that require a 501 (c)(3) for funding.

NCI also has past experiences with The Harvest Foundation, a private foundation located in Martinsville. This foundation serves organizations located in the areas of the City of Martinsville and Henry County. This foundation can be approached if needed for additional funding options.

4. Identify potential barriers to the planning process and possible ways to address them:

There are potential barriers to the planning process that could arise and would requiring solutions to move forward:

1. The amount of time until award of planning grant will hinder all progress in continued planning.
    a. The solution would be that NCI continue to reach out to school divisions to invite teachers for events and superintendents
2. Amount of time needed to contract with experts in K-12, curriculum development, and K-12 policy could hinder the progress of beginning the planning phase, especially with the upcoming holidays.
    a. The solution would be that NCI identify consultants needed upon submission of planning grant application to be ready to engage as soon as grant is awarded

3. School Divisions lack for participation or desire for a Lab School.
    a. As this is a current issue, NCI is hoping that by providing third party experts to manage the collaboration with the school divisions, they will open up to the concept and choose to participate

I. BUDGET OF DIRECT COSTS (WITH $200,000 MAXIMUM)

1. Complete the budget table below outlining the financial plan of how the Planning Grant will be used in the effort to establish a Lab School. The Planning Grant period and use of funds may not exceed 12 months from the date of award.

2. Only include direct operating costs. Indirect costs and capital outlay costs are not allowed. Include a description of expenses that explains appropriateness of expenses based on the category descriptions shown below.

3. All expenses must be directly related to the proposed Planning Grant activities. Applicants are not guaranteed the requested award amount and any award may be proportionally adjusted according to application's weighted Planning Grant Application Evaluation Rubric score and to reflect only those expenditures that are designated as permissible.

4. **Note: Any unspent Planning Grant funds remaining at the end of the grant term must be returned by the recipient to the Department.**

CATEGORY	DESCRIPTION OF EXPENSES	FUNDING REQUESTED
1000 – Personal Services		
2000 – Employee Benefits		
3000 – Purchased/Contractual Services	• Engagement of K-12 experts to collaborate with School Systems to identify needs, • Curriculum development expert, and, • K-12 Policy experts	$150,000

CATEGORY	DESCRIPTION OF EXPENSES	FUNDING REQUESTED
4000 – Internal Services		
5000 – Other Services	Travel & Accommodation expenses, meeting expenses, supplies	$25,000
6000 – Materials and Supplies		
Total		**$175,000**

*** Total cannot exceed $200,000 with additional funding considered at the discretion of the Department on a case-by-case basis and in accordance with available funds.**

Please visit the Virginia Department of Education OMEGA object codes universal guidelines for a complete description of the budget categories.

Three consultants/entities in a consulting role will be engaged for providing the support during the planning phases as indicated in the budget above. NCI will provide the venue for any meetings and events to help build the relationships and support from school districts, community members and other collaborators and stakeholders.

APPENDIX: PLANNING GRANT APPLICATION EVALUATION RUBRIC

For the applicant's information, the following will be used as the Planning Grant Application Evaluation Rubric for this application. Applicant does not need to complete this section.

AREA OF CONSIDERATION	DESCRIPTION	POINTS AVAILABLE
Targeted Student Population(s) and Relevant Research	Application proposes intention to serve at-risk students and/or offer a new, innovative model of instruction grounded in evidence-based practices to improve student academic proficiency, mastery, college and career readiness, and long-term outcomes.	**30**
Clarity of Program Description Goal, and Timeline	The program description and goal are clear and attainable. Indication of programmatic, operational, and infrastructural capacity to advance an application to launch a Lab School program, as well as launch a Lab School no later than the 2024-2025 school year. Additional preference will be given to applicants with an earlier Lab School launch timeline.	**20**
Sustainability	Evidence of institutional commitment to the viability of a Lab School in a manner that promotes quality, innovation, program results, and sustainability.	**20**
Collaboration	Evidence of engagement and collaboration with stakeholders, including local school divisions, community-based organizations, employers, teachers and parents.	**15**
Regional and Applicant Diversity	Evidence of diversity of location, with the goal of Lab Schools in each Superintendent region. For applicant diversity, preference will be given to new applicants in the event a concurrent applicant has previously received a Planning Grant during the current application period.	**15**