TABLE OF CONTENTS

COMPETITIVE PREFERENCE PRIORITIES

Priority 10 – Technology: The Middle School STEM Summer Learning Program places a large emphasis on not just STEM learning, but technology in particular. Students are immersed in a technology rich environment including the following:

- Utilization of Computers – Students are given the opportunity to use computers to aid in their learning during morning mathematics instruction. Either with a computer or with the help of a staff member, students are given the chance to work at their own pace with the specialized programs available, along with the Internet, creating many opportunities for students to utilize technology for learning.
- Programming – Students are also introduced to the advanced subject of computer programming at a basic level. In this supported, staff-rich environment, students can gain an appreciation for such an advanced technological subject, nurturing an interest that may direct students in their future studies of technology.
- LCD Projectors – LCD projectors are utilized wherever possible, creating a digital atmosphere for group learning.
- VEX Robotics – For today's youth, a platform that grasps attention and also tests a skill set is vital for education. VEX Robotics does just this, appealing to this competitive generation through a mix of "applied physics, mathematics, computer programming, digital prototyping and design, integrated problem solving, teamwork and thought leadership" (www.VEXrobotics.com). Students not only use this technology to compete, and possibly win, but also to gain an appreciation of science and technology, life skills as a team member, and research and technical skills.

Priority 7 – Innovations That Support College Access and Success: The STEM Summer Learning Program is aimed at middle school students. The goal is not only to raise student Maryland State Assessment scores in mathematics by focusing on the STEM subjects, but also prepare students for higher education.

Preparedness and Expectations: The Middle School STEM Summer Learning Program will be housed on three college campuses in Baltimore City – Johns Hopkins University, Morgan State University and Coppin State University. Students will engage in campus tours and forums exploring their expectations and preconceptions about college-life. When possible, students will be advised on topics from coursework to careers.

Finances and Application: Each group will be given a presentation on the application process aimed at the college where their program is housed, as well as financial aid information and resources that are available. Students will learn about STEM pathways that they can pursue in high school that will allow them to explore the content of the college programs being introduced.

Providing Support: All three colleges will provide Student Mentors who will help run robotics competitions, serve as judges, and visit the summer enrichment site at least once to work with teams. Student Mentors will not only help students academically, but will answer questions about their own educational experiences, in middle school, high school, and beyond. Beyond this support, Industry Mentors from companies like IBM and Northup Grumman will also work with groups on the robotics competition and be available for a real glimpse into the STEM industry.

A. NEED FOR THE PROJECT

Although Baltimore City Public Schools (City Schools) has made progress in improving student performance and narrowing achievement gaps, much work still remains. Research consistently demonstrates that summer learning loss contributes disproportionately to setbacks in performance for low-income students, and with all but one middle school within Baltimore City qualifying for Title I, the summer "slide" is of great concern, especially in the area of mathematics, where losses are great and performance is low. Typical Summer School programs have resulted in disappointing results, with only a fraction of enrolled students attending. City Schools has acknowledged the need for designing an engaging Summer Learning Program that will capture the imaginations of all students (including those most underrepresented in STEM fields), increase math proficiency, and cultivate a college going culture and interest in the STEM fields of study. In 2010, City Schools piloted a Middle School STEM Summer Learning Program that combined high-quality mathematics instruction with project-based robotics. The combination was successful; students began attending at much greater rates, and 70% of participants were able to completely avoid summer learning loss. Currently, City Schools seeks i3 funding to further investigate and refine this promising intervention.

Within City Schools, overall achievement and achievement gaps are an issue that has long been given attention. "Achievement gaps are particularly troubling because they comport with subsequent inequities in educational attainment, in which students from the bottom quartile of the income distribution are more than twice as likely to drop out of high school as students from the top quartile of the distribution (National Center for Education Statistics, 2007)" (McCombs et al., 2011, p.1).

Summer learning loss contributes to the achievement gap. According to the RAND report, "How Summer Programs Can Boost Children's Learning" (McCombs et al., 2011), there is some evidence that low-performing students will benefit from more time on task. Income, too, makes a difference: "Children from lower-income families lost, on average more learning…than children from higher-income families," (p. 22). High-quality, targeted summer programming can stop summer learning loss and even lead to gains for such students. In 2009, of City Schools' students who received Title I services, only 56.3% scored at the Proficient/Advanced level on the 6th grade Maryland School Assessment (MSA), 39.8 % scored at the Proficient/Advanced level in 7th grade, and 35.3% scored at the Proficient/Advanced level in 8th grade.

Table 1. 2009 Math MSA Statistics.

Grade in 2009	Total # of Students who took 2009 Math MSA	# of Students who Scored P/A on 2009 Math MSA	% of Students who Scored P/A	# of Title I Students	% of Title I Students who Scored P/A on 2009 Math MSA
6	5,388	3,133	58.1%	3,194	56.3%
7	5,403	2,378	44.0%	3,587	39.8%
8	5,474	2,146	39.2%	3,855	35.3%
TOTAL	16,265	7,657		10,636	

In 2009 (prior to the implementation of the STEM Summer Learning Program), middle grades students took the end-of-year math benchmark. An average of 22.4% scored at the Proficient/Advanced level. The following fall, only 16.7% of students scored at the same level *on the same indicators*. Unfortunately, the OARS student performance system could not separate out students who were receiving Title I services (City Schools has since switched to SchoolNet which will allow this level of analysis), but it is likely that they fared even worse.

Table 2. 2008-2009, 2009-2010 Math Benchmark Statistics.

Grade in 2008-2009	% of Students who Scored P/A on Math End-of Year Benchmark 2009	Grade in 2009-2010	% of Students who Scored P/A on Math Beg-of Year Benchmark 2009
6	29.3%	7	18.3%
7	21.8%	8	15%
8	16.1%		
AVG	22.4%		16.7%

Benchmark scores reflect an alarming loss in learning due to the summer break, even though some 1,243 (of 7,402) students were enrolled in Summer School that year. Unfortunately, more than half of the students who enrolled in summer school did not complete the program; there was a 58% drop in attendance for rising 7th graders and a 51.6% drop in attendance for rising 8th graders. McCombs et al. (2011) report that student engagement is often a problem in voluntary summer learning programs.

For those students who did complete Summer School in 2009, results indicate that student scores increased on pre/post assessments, from 12.5% to 28.3% for sixth graders and from 28.7% to 43.5% for seventh graders.

Table 3. 2008-2009, Math Pre-Post Assessment Statistics, Summer School Attendees.

Grade in 2008-2009	# of Students who Enrolled in Summer 2009	# of Students who took Pre-Assessment in Summer 2009	% of Students who Scored P/A on Summer 2009 Pre-Assessment	# of Students who took Post-Assessment in Summer 2009	% of Students who Scored P/A on Summer 2009 Post-Assessment
6	**632**	**566**	**12.5%**	**367**	**28.3%**
7	**611**	**442**	**28.7%**	**315**	**43.5%**

The mathematics instruction appeared to be working, but City Schools knew something had to be done to encourage student attendance.

In 2010, the Summer Learning Program was launched. It increases student attendance by offering project-based learning opportunities through daily VEX robotics competitions that appeal to students' interest. City Schools' Middle School STEM Summer Learning Program was recently spotlighted in *Education Week* (Fleming, July 13, 2011) as a creative approach to preventing summer slide. This project-based solution is highly engaging. In 2010, more than 75% of students attended at least 50% of the Program.

Achievement data from participants of the 2010 Summer Learning Program show that from the June 2010 mathematics benchmark to the September 2010 mathematics benchmark, 70% of summer program participants either maintained their score (+/- 5 points) or gained more than 5 points over the summer. This is remarkable considering the fact that City Schools typically sees a substantial decrease in student scores from June to September due to summer learning loss (as exemplified above).

But a need still exists. Of the 15,943 students who took the 2010 Math MSA, 7,648 students are still scoring below Proficient, with 33.7% of those being Title I students. 66.5% of Title I students taking the Science MSA are scoring below Proficient, or 3,165 students. Graduation rates are up since 2007, from 60.1% to 66%, especially for minority races and special needs students – but that number leaves much room for improvement. The dropout rate continues to decline as well, except for students in poverty, whose dropout rates have increased by a startling amount (.48% to 3.47%). These are the students who are targeted for individualized, engaging summer programming.

Past implementation as well as literature from the field suggest that the Middle School STEM Summer Learning Program is a promising practice that will curb summer learning loss, narrow the achievement gap, and help students develop skills necessary for success. This project makes

STEM education a priority, through the innovative use of individualized help and hands-on technology use. By offering project-based learning opportunities such as VEX robotics, the Summer Learning Project has been able to increase the number of middle school students enrolling in and regularly attending the summer learning program, with waitlists forming for the 2011 session. To help curb dropout rates and raise interest in continuing education, the program exposes students to postsecondary education through college campus tours, financial aid presentations, mentorships with students and staff, and more. Students have resources available to them, perhaps for the first time, which allow them to pursue STEM content like never before.

B. QUALITY OF THE PROJECT DESIGN

Goals of the Project: City Schools has set clear goals for this project and has designed strategies for attaining these goals that have been proven by research and program evidence. With the successful completion of the Middle School STEM Summer Learning Program in 2010 and ongoing implementation in 2011, refinement of strategies has led City Schools to continuously improve the program to continue to enrich middle school youth in the area of STEM.

This project is designed to offer project-based learning experiences to underachieving students in the areas of science, technology, engineering and mathematics. The project will target rising 7th and 8th grade students.

Recruitment Goals: 1500 students will be recruited to participate in the program (Year 1 – 400; Year 2 – 500; Year 3 – 600). 80% of these students will be eligible for Free and Reduced Meals (FARM, a measure of poverty); 95% will represent minority racial and ethnic groups; 80% will have scored below Proficient on the previous year's math MSA; and 50% will be female.

Attendance Goal: At least 80% of the students who are enrolled in the summer program will attend at least 70% of the time. Student attendance will be tracked using the Student Management System (SMS).

The primary goal of the summer learning program is to provide additional out of school time and alternative educational opportunities to targeted students so that they can increase their mathematics grade-level aptitude by the end of the summer learning program, develop interest in technology and STEM, and encounter a college-going culture. Desired outcomes for students include the following:

Student Achievement Goals: 50% of students who scored below Proficient on the Math MSA the year prior to the Summer Learning Program will achieve a score of Proficient or Advanced the year following the program.

100% of students will maintain and/or increase their June Mathematics benchmark results when the same assessment is given in August, to show both retention and growth in mathematics grade-level aptitude.

All students who participate in the summer program will demonstrate mastery of the selected summer math skills, which are aligned to the Maryland State Curriculum, by scoring at least an 80% on concept assessments given during the summer program. The selected math skills will be pulled from the end-of-year math benchmark data – skills on which the majority of students show deficiency.

Participating students will increase their (1) desire to attend college, and (2) desire to engage in a STEM college major and/or career, as measured by a pre- and post-program survey.

Teacher Effectiveness Goals: In addition to goals aimed at student improvement, a secondary goal is to recruit teachers from underrepresented STEM areas and to improve their teaching effectiveness. The project provides two weeks of extensive and targeted professional development to participating teacher leaders to bolster their abilities in the STEM field, as well as professional development for one hour each day of the program. Goals for teachers include the following:

Recruit 15-20% teachers from upper elementary grades, to encourage STEM learning in elementary grades.

All participating teachers will increase instructional performance scores on the City Schools Instructional Framework observation the year following their participation in the Summer Learning Program, as compared to the previous two years.

See Appendix J for a Logic Model that aligns strategies and outcomes for this project.

Strategies of the Project: Strategies for meeting the above goals are direct, concise and proven. City Schools will establish three summer school centers on college campuses in the city for the purpose of reinforcing and developing math skills using a project-based learning model focused on STEM. Recruitment goals ensure that high-need students, as well as those who are underrepresented in STEM fields comprise the majority of students involved in the program.

The summer learning program lasts a total of 25 days (5 weeks). Students are provided 3 hours of core instruction, followed by lunch, and in the afternoons, students partake in an innovative component to raise interest and proficiency in STEM – a robotics competition. This competition allows students to experience hands-on STEM learning, applying what they learn in the classroom in a working environment. International Robotics Coach of the Year in 2009, Josh

Gabrielse, leads students through this portion of the program, lending his expertise and mentorship to those students who wish to be involved in STEM. Last year, one of the Summer Learning Program teams advanced through regional competitions and was invited to an international robotics competition in Disney World. Thirteen students placed first in the underwater division for middle school. It was the first time City Schools had ever sent a team, and the entire system was proud of the achievement of these students.

Robotics-based learning nurtures the type of skills in students espoused in the Common Core State Standards for Mathematical Practice. Students learn to make sense of problems and persevere in solving them, critique the reasoning of others, model with mathematics, use tools strategically, and attend to precision (CCSSO & NGA, 2010). Above and beyond the basic staff for the program, students are also in an education-rich environment, placed on one of three college campuses for their program. Here students can experience campus life of higher education, before they get ready to make the decision to continue on at that level. They take a campus tour and learn about admissions and financial aid processes. Furthermore, volunteer mentors from companies, including Northup Grumman and IBM, as well as participating universities - Johns Hopkins University, Morgan State University and Coppin State University - offer their services to the program as mentors for the youth, during both instruction and the robotics competitions.

Each school will use both of the following Math curricula for the core mathematics instruction, focusing on the instruction of math skills in which students show deficiency. The selected skills are pulled from the last quarter benchmark for the student's grade level and aligned with Common Core Standards for Mathematics.

1. The City Schools Math Works curriculum, which has been proven successful in increasing student achievement in mathematics, is used for core mathematics instruction. Math Works was founded in 2003 with the establishment of a 5th grade Math Works professional learning community (PLC). In 2006, a sixth grade PLC was created. That same year, City Schools funded Math Works to facilitate Saturday workshops for all of teachers who worked in schools in Area 9. These schools were selected because their scores were consistently the lowest in the district. A report by City Schools Division of Research, Evaluation, Assessment, and Accountability found that the math MSA scores of the students whose teachers had attended Math Works workshops were higher than the city average. In sixth grade, 70% of students of teachers engaging in Math Works training scored proficient or advanced on the math MSA, while only 35% of students of teachers not trained in Math Works did so. Additional supports for this program, which now spans all middle school grades, are presented in the Response to Evidence Standards section of this proposal.

2. First in Math (FIM) is an online math fluency program that allows students to experience improvement in numerical fluency and increased speed in core mathematical operations. As students progress through each **module, a** record is kept of individual progress as well as team progress. Students advance at different rates, according to their individual skill levels and real-time assessment results.

The School District of Philadelphia implemented First in Math in 2003 to target the needs of its urban population base. During the course of using this program, students in grades 5-8 made substantial gains in the area of fact fluency. In the 2004-2005 school year, 23 of the Top 50 FIM Schools realized double digit increases in 5th grade, while 27 out of the Top 50 realized double digit increases in 8th grade scores.

Participating teachers will also be given the opportunity to expand their STEM knowledge and teaching capacity. Prior to the program, all teachers receive two weeks of professional development. One week is dedicated to the mastery of leading the students through robotics and is led by Josh Gabrielse. The other week is spent learning the teaching strategies necessary to effectively teach a STEM subject at the middle school level. Ryan Reid and Charlene Footman, the project's Math Coordinator and Program Manager, respectively, lead this portion of the professional development. A STEM consultant and contracted professional development providers offer facilitation support.

Advertising and recruitment strategies allow the project to recruit diverse and high-need participants. All program brochures and website postings are available in both English and Spanish, and the program uses advertising strategies such as posting bus signs across the city, advertising on Spanish radio stations, and door-knocking campaigns. In addition, Program Coordinators plan a Summer Learning Fair for families, where the Middle School STEM Summer Learning Program is highlighted. These advertising strategies have been refined based on results of marketing research in the past two years.

All of the above strategies align with Absolute Priority 2, and each has evidence that it supports student achievement in mathematics. Those data, as well as the past success of this program (outlined in the Response to Evidence Standards section of this proposal) lead City Schools to the reasonable hypothesis that these strategies will meet the goals this program aims to achieve.

Estimated Cost of the Project: This program is estimated to cost approximately $3,600,022, which includes the start up and operating costs per student per year. This cost will reach approximately 400 students in Year 1, 500 students in Year 2, and 600 students in Year 3, for a

total of 1500 students by the end of the grant period. For a full projection of costs, see the Budget Narrative.

The program will cost roughly $2100 per student to replicate; therefore, costs to reach 100,000 students are $210,000,000; costs to reach 250,000 students are $525,000,000; and costs to reach 500,000 students are $1,050,000,000.

Reasonability of Cost: To examine cost, City Schools has used a RAND Education study for guidance. The RAND Corporation, an educational non-profit, conducted a literature review to identify common funding sources for summer programs and collected detailed cost data from seven summer learning programs to determine their costs and the primary reasons for the variation among them (McCombs et al., 2011, p. xiv). Their findings show that providing a high-quality summer learning program can cost between $1,109 and $2,801 per child for a six-hour-per-day, five-week program (p. xvi). Additionally, the cost of summer school programs can be less than two-thirds of what providers spend on programs during the academic year (on a per-slot, per-week basis), (p. xvi). As our project currently costs $2,100 per student, it is deemed reasonable and moderately priced in this study's scope, especially given the technology employed within the Middle School STEM Summer Learning Program.

Ongoing Work: Although i3 funding would make this project possible during the three year grant period, this program intends to continue into the future, so long as the benefits and results continue to be produced. With a rigorous evaluation funded by i3, the success of this project will be used to introduce the Middle School STEM Summer Learning Program to the Board of Education as a stable, budget line item into the future.

C. QUALITY OF PROJECT EVALUATION

To ensure a rigorous, third party evaluation of the MS STEM Summer Learning Program, the Baltimore Education Research Consortium (BERC) will conduct the evaluation to assess the impact of the program on the engagement and achievement of high-need students, their interest and aspirations for college, as well as the program's effect on classroom instruction. The evaluation will comprise both an implementation study as well as an impact study, examining and providing immediate feedback on reaching program specific goals to foster continuous program improvement, and then examining impact. Student impact will be measured by performance on math assessments (local benchmark and MSA). Teacher impact will be measured through observation of instruction. Project goals are outlined in the Project Design section of this proposal. In addition, a logic model (see Appendix J) clearly ties program design to program outcomes studied by the evaluation.

Implementation Study. Using easily available administrative data, BERC will be able to monitor progress in meeting recruitment, attendance and student achievement goals throughout the grant period. These interim reports will be provided to key personnel to inform practice and to increase the impact of the program. Summary data identifying goals met and those not will be provided for each project cycle. These analyses will be based on student attendance, development of aspirations and interest in college and STEM major/career, and performance on the mathematics MSA, benchmark assessments, and concept assessments.

Analyses will be conducted on existing captured administrative data on attendance, through a pre- post student survey on knowledge, attitudes and behaviors on STEM interest and developing college aspirations, and benchmark, concept and MSA assessment results. Indicators of green (on track to meet goal), yellow (not quite on track to meet goals), and red (not on track to meet

goal) will be included in the interim reports to help staff prioritize and address needs.

Student Impact Study. BERC will assess the impact of the initiative to address the following, overarching research question: *To what extent does the STEM Summer Learning Program improve engagement in instruction and performance for students currently scoring below Proficient on the math Maryland School Assessment (MSA)?*

A random assignment design cannot be used because participants will intentionally be recruited from low-performing students and those underrepresented in STEM areas, so BERC proposes to conduct a quasi-experimental study using a regression discontinuity (RD) design that can determine a causal effect. By exploiting a given exogenous threshold used to determine treatment, in this case scoring below *Proficient* on math MSA, and having a treatment group size of approximately 200, using a one-tailed test, our design will have an 85 Percent Power Score of 2.68. (IES **Table A.1. Values for FACTOR(.) in Equation (1) of Text, by the Number of Degrees of Freedom, for One- and Two-Tailed Tests, and at 80 and 85 Percent Power, http://ies.ed.gov/ncee/pubs/20084026/tables/table_a_1.asp).**

Teacher Impact Study This analysis will address the following, overarching research question: *To what extent do the STEM Summer Learning Program professional development opportunities improve instruction in the classroom for middle and elementary school math and science teachers?*

BERC will assess teacher impact using the City School developed Teacher Effectiveness measures in addition to observations conducted using the Classroom Assessment Scoring System (CLASS). The CLASS is an observation instrument and protocol developed by researchers at the University of Virginia (Pianta, La Paro & Hamre, 2008). It has been used as a research tool in multiple observational studies of elementary school classrooms and in evaluations of specific

classroom interventions (for a listing of these studies see http://www.teachstone.org/research-and-evidence/research-summary). It has also been used extensively by schools and school systems as a teacher assessment and professional development tool. For the present project, a team of observers will complete multiple CLASS observation spells across teacher classrooms during the year. The CLASS measures aspects of classroom quality across 10 dimensions which can be grouped into three broad domains: *Emotional Support*, *Classroom Organization*, and *Instructional Support*.

Measures and Data Collection: The proposed evaluation will assess the impact of the summer school intervention on student achievement (test scores) and engagement (knowledge, attitudes and attendance). Background covariates include gender, race/ethnicity, poverty, and special education status. The sources for impact data include student and teacher survey items and constructs, student-level data from district and state records, and classroom observations (using City Schools' developed observation tool and scores and/or the CLASS).

Analysis and Reporting: Data on attendance will be available to team members on a daily basis through the SMS system. At the conclusion of each summer, the Summer Program team will receive a report on how well they met annual goals. These reports will be shared with teams for process improvement purposes and to inform implementation changes for the following summer. Data will be disaggregated by program site and grade and for student goals by gender, socioeconomic status, proficiency on the math MSA the previous spring, and by those who passed the benchmark assessments.

Analysis of the program impact on student achievement and engagement and on classroom instruction will be reported as it becomes available in order to make mid-course corrections and inform implementation for the next summer. Data will be disaggregated by program site, grade,

and student demographics including prior achievement. The Impact analysis on students and teachers will be available the following summer because observations are conducted throughout the year, and MSA results are available in June.

Launched in fall 2006, BERC is a partnership among Johns Hopkins University, Morgan State University, and City Schools, operated with support from several Baltimore-based non-profit agencies. Modeled loosely on the Consortium on Chicago School Research, BERC pursues both long- and short-term data analysis and research, executing core analytic research projects and rapid response tasks to generate results to share with City Schools. BERC is an impartial, third party evaluator not involved with implementation of City Schools' programs.

D. QUALITY OF THE MANAGEMENT PLAN AND PERSONNEL

Responsibilities and Qualifications of Key Personnel: The Middle School STEM Summer Learning Program will be governed by a standard hierarchy, as follows:

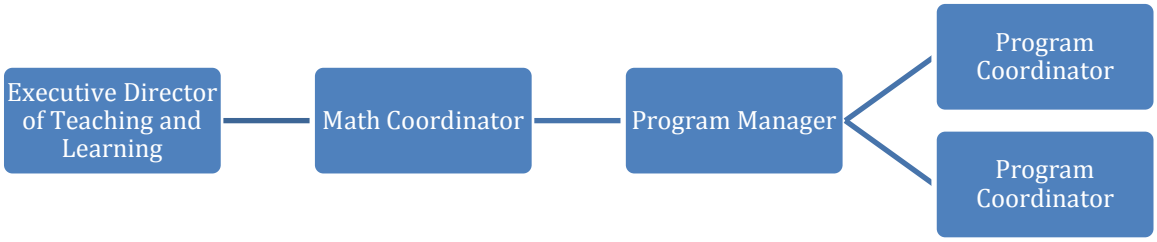

Figure 1. Diagram of Summer Program Hierarchy.

The Math Coordinator will oversee project personnel and will report directly to the Executive Director of Teaching and Learning. There will be one Program Manager and two Program Coordinators for this project who report to the Math Coordinator.

The Program Manager will be responsible for ensuring that summer school centers have the necessary resources to support the grant outcomes. She will work with the Human Capital Office to ensure that highly qualified and highly effective Consultants, Site Directors, and Teachers are

selected to participate in the summer learning program. The Program Manager will work with the Program Coordinators to develop and execute advertising for the summer learning program initiatives. The Manager will meet with Program Coordinators and Site Directors on a weekly basis to monitor student achievement progress through SchoolNet data management system and set weekly student achievement goals. The Program Manager will also be in charge of assigning students to their closest designated summer school site and securing transportation for those students.

The Program Coordinators will work with the Program Manager to develop and execute advertising for the summer learning program initiatives. They will plan a summer academy fair at which parents and students can learn more about the various summer learning programs and apply for their program of choice. Program Coordinators will work closely with Site Directors to analyze student achievement data and create weekly action plans to keep students progressing toward the goal of 100% gaining in benchmark scores by the end of summer. Program Coordinators will track student attendance through SMS and set weekly attendance goals with Site Directors.

Site Directors will meet weekly with the Program Manager and Coordinators to analyze concept assessment data, create action plans for their sites, and collaborate with other Site Directors. The Site Directors will oversee the day-to-day implementation of the program and will provide direct leadership to teachers at their site.

All key personnel, the three site directors, the project evaluator and personnel from the Office of Human Resources and the Office of Teaching and Learning will meet twice yearly to examine results of the implementation and impact evaluation and will modify the Middle School STEM Summer Learning Program based on results. This governance structure and improvement process

has been used successfully since the inception of the project, resulting in differentiated advertising strategies and more emphasis on student-centered instruction in the morning sessions of the program.

Partnered with Baltimore City Public Schools are two official partners that will be providing invaluable services toward the success of this program. The Fund for Educational Excellence (Fund) is a nonprofit organization working to improve achievement for all students in City Schools. They work with schools to secure financial, human and knowledge resources to support policy and practice that will result in increased achievement for students. The Fund will be helping the program by providing fundraising efforts. The Baltimore Education Research Consortium (BERC) is a partnership between City Schools, Johns Hopkins University, Morgan State University and other civic and community partners. Their mission is to conduct and disseminate long- and short-term strategic data analysis and research to help inform policy and practice decisions for the students of Baltimore. BERC will be responsible for conducting the full evaluation of the success of the Middle School STEM Summer Learning Program.

Other partners on board with the project include IBM, Northrup Grumman, Johns Hopkins University, Morgan State University and Coppin State University. Together, these partners will be providing 50 volunteers to work 4 full days each summer at the VEX Robotics competitions and 200 mentors each year to meet with students on a weekly basis, with at least one face-to-face meeting between mentor and students each summer. In addition, the universities will provide volunteers to lead students on campus tours and volunteers to talk with students about application processes and financial aid.

The following personnel will serve key roles in the STEM Summer Learning Program. For more information on each individual, see their resumes in Appendix F.

- **Linda Eberhart** will function as the Executive Director of Teaching and Learning. Ms. Eberhart has a Master of Liberal Arts from Johns Hopkins. She has served as the Director of Mathematics for City Schools, and has served as a Math Teacher for over three decades. As Director, Ms. Eberhart has overseen numerous grant-funded projects related to mathematics, student achievement and improving student instruction. Ms. Eberhart has also worked with hundreds of city teachers to create aligned and informative math benchmark tests and curricula.
- **Tiffany Ryan Reid** serves as Mathematics Coordinator. Ms. Reid received a certificate in K-8 Mathematics Leadership from Johns Hopkins University and an endorsement in Administration and Supervision I from the College of Notre Dame. Ms. Reid currently serves as Program Manager for the Baltimore City Public Schools, specializing in extended learning. Concurrently, she is a Facilitator for Math Works. From 2009 to 2010, Ms. Reid worked as a Mathematics Teacher Fellow, coordinating over 100 teachers in the creation and revision of the City Schools Math curriculum and benchmark assessments for grades 1-8.
- **Charlene Footman** will serve as the Program Manager for the Summer Learning Program. Ms. Footman received a Master of Arts in Teaching from Johns Hopkins, a Post-Masters Administration and Supervision Certificate from the College of Notre Dame and an Advanced Professional Certificate for Elementary Education Grades 1-6 and Middle School. At present, she is serving as Program Coordinator for City Schools, coordinating the implementation and support of new initiatives and standards that provide for quality instruction, effective student services, and improved school operations. Ms. Footman is also a five-year Math Works Facilitator. In the past, she has been a Teacher Leader in the district and a Curriculum Writer, as well as teacher in City Schools.

- **Joshua Gabrielse** will serve as a Program Coordinator. Mr. Gabrielse is a highly motivating science and robotics teacher, using his expertise to enable more Baltimore City students to pursue careers in science and technology. Before his current role as Consultant on the robotics portion of this program, Mr. Gabrielse earned his BS from Calvin College in Physics with a Mathematics minor and a Master of Arts in Teaching from Johns Hopkins University. In the world of robotics, Mr. Gabrielse holds positions as the VEX Coach for the Dulaney Robotics Team, is a member of the VEX Mid-Atlantic Championship Planning Committee and received the *Teacher of the Year Award* at the VEX World Championship for 2009.
- The second Program Coordinator is to be named. The job description for this position is outlined above.
- **Faith Connolly** is the senior evaluator for the project. Her education includes a Ph.D. in Public Policy from the University of Maryland, an M.S. in Information and Telecommunications from Johns Hopkins University and an M. Ed. in Secondary Education from the University of Hartford. As the Executive Director for BERC, Ms. Connolly works with the organization to ensure the compilation of strategic data analysis and research that informs decisions about policy and practice to improve the educational and life outcomes of children in Baltimore. She has also served as the Deputy Chief of Assessments and Accountability for the DCPS system, helping to build a research team to reform assessment efforts and implementation.

Timelines and Benchmarks for Project:

January - April 2012, 2013, 2014: Highly qualified school staff are recruited as teachers and Site Directors. The Office of Teaching and Learning as well as the Human Capital Office are given guidance by the Executive Director of Teaching and Learning to hire highly qualified (as defined by the Maryland State Department of Education) and highly effective teachers based on yearly

performance evaluation and student achievement results. The Office of Teaching and Learning works with the Human Capital Office to establish a hiring process that allows all sites access to highly qualified and highly effective teachers, and meets the recruitment goals for this project.

Advertising for the program begins in spring, with brochures distributed to all students (available in English and Spanish), bus signs posted throughout the city, radio and newspaper spots (including Spanish radio stations and newspapers that cater to particular cultural groups), and door-knocking campaigns. In addition, information is posted in English and Spanish on the City Schools website.

Students participate in the Maryland School Assessment. The evaluator analyzes results as they become available. Key personnel meet to review the previous year's evaluation and make changes to the program based on results.

May-June 2012, 2013, 2014: Volunteer student mentors (from local colleges) and industry mentors are recruited and provided with information about the program and their responsibilities. Students from all schools participate in benchmark testing, to assess their progress during the current school year and indicate if help is needed in the area of mathematics. During the last week in May, Site Directors participate in a Summer Academy Fair at various locations across the city to advertise the summer learning opportunities for middle school students. Students who are interested in applying to the summer academies submit their applications, which are available in English and Spanish. Parents and participating students receive a letter by June 21 indicating which summer school center their student will be attending. Program materials are ordered based on projected student enrollment. The project evaluator provides regular enrollment updates to keep recruitment on track to meeting enrollment goals.

All teachers and site directors participate in two weeks of professional development prior to the start of the program.

July – August 2012, 2013, 2014: The STEM Summer Learning Program runs for 25 instructional days, with the student instructional day from 8:00 am – 2:30 pm, consisting of breakfast, core mathematics instruction, lunch, and robotics project-based learning using integrated math and the STEM model. During the five-week session, pre- and post-testing and teacher/student surveys are conducted by the evaluator. Students travel a maximum of 30 minutes to their summer program. One two-day scrimmage and one two-day VEX robotics competition are held each year at a central location. One hour of daily Teacher Professional Development (25 hours, in addition to the 60 pre-program hours) is provided. Site Directors meet weekly with the Program Manager and Coordinators to analyze concept assessment data, create action plans for their sites, and collaborate with other Site Directors.

September 2012, 2013, 2014: The effectiveness of the summer academies is evaluated by comparing the end-of-year benchmark scores and the beginning-of-year benchmark scores, as well as by comparing pre-tests and post-tests. See the Evaluation section for details on the evaluation design and analytic strategy. Key personnel meet to review evaluation results, discuss the effectiveness of the summer learning program, and determine any changes that need to be made for the following year.

September – June 2012, 2013, 2014: Robotics instruction continues at all Middle Schools, either through programming during the school day or through after school robotics clubs. Teams participate in regional and international competitions. Please note that this activity is not funded through i3.

The evaluator conducts in-class observations of Summer Learning Program teachers to determine changes in teaching practice, according to the analytic strategy described in the Evaluation section.

December 2012, 2013, 2014: City Schools submits required annual i3 reports.

Sustainability and Scalability: The real value of an i3 award for the Middle School STEM Summer Learning Program is in the evaluation results produced by the project. The Board of Education of City Schools seeks to fund programs with proven results, philanthropists also seek to support such programs, and other urban districts seek proven programs to replicate. Once City Schools has sufficient data that show what aspects of the Middle School STEM Summer Learning Program are most effective and who is most positively affected, we will request funding to continue the program as well as increase grade level bands. Our vision is to expand the STEM Summer Program into the upper elementary grades as well as high school, and expand the number of robotics clubs available during the school year. We look forward to sharing what we learn with others and curtailing summer learning loss.

Please see Appendix J for References.