# Growing Rural Opportunities (GRŌ STEM) Residency Program: Reducing the achievement gap of students in high-need rural schools

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GRŌ STEM-Introduction
A.1. Significance

California State University, Bakersfield (CSUB) in a collaborative effort with three Central Valley California rural high-need districts, Buttonwillow Union School District (BUSD), Lamont Elementary School District (LESD), and Semitropic Elementary School District (SESD), proposes a rural residency program: Growing Rural Opportunities (GRŌ STEM) Residency Program, which will improve teacher preparation and work to close the achievement gap among rural, low socioeconomic, English learners in California’s Central Valley. GRŌ STEM will improve student achievement and decrease the high teacher turnover rate in the Central Valley by recruiting, preparing, and mentoring minority teachers; by providing teachers customized induction; and by placing students in local high-need rural schools upon program completion. The partnership will address the critical shortage and high teacher turnover facing rural schools by developing a 15-month multiple subject credential and master’s residency program with an emphasis in STEM. The partnership will prepare 120 postbaccalaureate multiple subject credential completers (K-8 California teacher certification) with a master’s degree in Curriculum and Instruction over five-years.

A.2.i.ii Building Local Capacity and System Improvement

The GRŌ STEM Residency will emphasize teaching English learners (ELs) STEM and academic literacy. A component of this program will enhance the administrative and teacher leadership skills of administrators, teacher leaders, and Residents in rural, high-need partner schools through professional development.

Rural districts in California’s Central Valley face many challenges, including poverty, isolation, and language barriers. Poverty is the "600 pound gorilla" that is sitting on rural schools (Berliner, 2004). Rural districts are geographically and culturally isolated and lack
many resources that larger urban districts have. Nearly 6.5 million students attend rural schools (Hill, 2014). Rural teachers and administrators often face overwhelming challenges due to poverty and the lack of tax revenue, inability to meet English learner needs, and difficulty attracting and retaining new qualified teachers (Hill, 2014). In two of our rural district partners, the superintendents also serve as principals. The hardships faced by rural districts have led to a critical shortage and high-teacher turnover among rural Central Valley schools. According to study by WestEd (2008) it is projected that the Central Valley will experience some of the greatest demand for teachers in California by 2015-16. Kern County will need 1,657 teachers based on student-enrollment projections and 2,115 teachers based on retirement projections (Bakersfield Californian, 2014). This places Kern County number 6 on a ranked list of counties projected to experience the greatest need for teachers from 2005-06 to 2015-16 (Bakersfield Californian, 2014).

In a collaborative partnership, three rural high-need districts, among the lowest performing schools in the state of California, will work with CSUB to develop and implement the GRŌ STEM Residency to address the absolute and competitive preference priorities outlined in the Teacher Quality Partnership Grants Program Application.

The GRŌ STEM Residency Partnership will address Absolute Priority 2: Partnership Grants for the Establishment of Effective Teaching Residency Programs by creating a rural teacher residency program that will prepare 120 postbaccalaureate multiple subject credential completers (K-8 California teacher certification) and master’s in Curriculum and Instruction over five-years. The needs assessment found that districts understand the importance of developing the teachers’ content knowledge for delivering high quality STEM to elementary and middle school grades. Residents will gain content knowledge and pedagogy, and will
experience inquiry-based STEM preparation upon completion of their multiple subject credential (*Competitive Preference Priority 1: Promoting Science, Technology, Engineering, and Mathematics*). Residents will be prepared to complete a Foundational-Level Mathematics (FLM) or Foundational-Level General Science (FLGS) Credential. The FLM and FLGS Single Subject Teaching Credential in California authorizes the holder to provide instruction in math or science content taught in K-12 (typically through grade 8). This unique feature of the GRŌ STEM Residency Program will address the demand for STEM teachers as cited in the *100Kin10 Initiative* by producing Residents who are highly qualified to teach math and science. GRŌ STEM Residents will build their capacity as STEM teachers through experiential opportunities including participation in STEM afterschool and summer programs, additional content support, professional development, and classroom instruction.

The GRŌ STEM Residency partnership will also address *Competitive Preference Priority 2—Implementing Internationally Benchmarked, College- and Career-Ready Elementary and Secondary Academic Standards*. Residents, district teachers, and administrators will participate in intensive Common Core State Standards (CCSS) and the Next Generation Science Standards (NGSS) professional development (PD). The PD will address both the content and process aspects of teacher growth that research shows is of the utmost importance in an effective PD model (Thompson and Goe, 2009 citing Reeves, McCall, & MacGilchrist, 2001; Wilson & Berne, 1999). Candidates will participate in in-service training, participation in the BLAST! Summer Academy, Saturday workshops, and coursework, all of which reflect GRŌ STEM’s sustainable approach to delivering high-quality PD. The IHE and LEAs partnership will support and fund PD by providing matching funds as well as in-kind support. Professional development training will provide an interdisciplinary
approach to content and learning with university faculty from different academic fields (Teacher Education, Math, Science & Engineering). LESD and CSUB recently received a California Math Science Partnership (CaMSP) grant that provides STEM and Common Core-Math PD for current classroom teachers and uses the KHSD model of Common Core PD. The GRŌ STEM partnership will leverage work from the CaMSP grant allowing CSUB to expand the project to include BUSD and SESD.

**GRŌ STEM Partners**

**CSU, Bakersfield, School of Social Sciences & Education-Department of Teacher Education**

**Education:** CSUB is one of 23 campuses in the CSU system, and serves a region covering 25,000 square miles at the southern end of California’s Central Valley and approximately 8,500 students. CSUB is a diverse Hispanic Serving Institution (HSI): over 50% of students are underrepresented minorities and 75% of first time freshmen are first-generation college students. More than 70% of CSUB’s 35,000-plus alumni live and work in CSUB’s service region. CSUB is the only four-year public institution of higher education within a 100-mile radius of Bakersfield. Although Kern County struggles to produce Hispanic postbaccalaureates (only .4% have a postbaccalaureate degree), CSUB has made considerable strides in recruiting a diverse undergraduate body. As of fall 2013, 51% of undergraduates are Hispanic, and 38% of postbaccalaureates are Hispanic (CSUB IRPA, 2013). CSUB maintains full accreditation by the Senior College Commission of the Western Association of Schools and Colleges (WASC). The **School of Social Sciences & Education** and is the largest of the four schools at CSUB, and within the school the **Department of Teacher Education** offers preliminary credentials in multiple subject, single subject, and special education. In the 2013-2014 academic year, CSUB’s teacher preparation program had 193 program completers (CSUB, 2014). All programs are
accredited by the National Council for Teacher Education (NCATE) and meet all California Commission on Teacher Credentialing (CTC) requirements. On the most recent CTC Annual Report Card on California Teacher Preparation Programs for the Academic Year 2011-2012, CSUB received summary pass rate for program completers of 95% (CTC Report Card, 2013). Passing competencies indicate CSUB is classified as one of the highest-performing teacher preparation programs in the State (State Report Card under section 205(b) of the HEA).

CSUB TED participation in the TQP Central California Partnership (Edvention) has helped complete a reform of the teacher preparation program by using the 15 reform elements promoted by the DOE and integrating them into the course work and the field experience. In addition to the reformed courses CSUB implemented the St. Cloud co-teaching model for field experience. This became the hallmark of the preparation program, but the field experience indicates a need for a pure residency model. Currently, teacher candidates spend 360 hours in a classroom placement and only 300 hours utilizing the co-teaching model. With the proposed residency model, candidates will spend over 800 hours co-teaching and an additional 150 hours involved with K-8 students in a BLAST! experience. Residents will also work as educators in afterschool programs throughout the school year, first as class support and then as lead instructors. Residents’ academic time with K-8 students will increase by over 300%.

A.2.iii. Shortage of Professionals in the Field

School District Partners & Need: The communities of Buttonwillow, Semitropic, and Lamont are located in Kern County in the heart of the California’s Central Valley, one of the most productive agricultural regions in the country with a large migrant population. Kern County is home to over 839,000 people and, according to the U.S. Census Bureau, is 49% Hispanic (national average is 15%). Kern County is also one of California’s highest needs regions with an
unemployment rate of 11%. This compares with an unemployment rate of 7.1 percent for California and 6.1 percent for the nation during the same period (CA Employment Development Dept., 2014). One out of every four families with children in Kern County lived below the poverty line (Kern County Network for Children). As the fourth most productive agricultural county (by value) in the United States, most of the residents in rural communities are farm workers (Bakersfield Visitor and Convention Bureau, 2012).

The Buttonwillow Union Elementary School District (BUSD) is located 26 miles outside of Bakersfield, CA. It is 6.9 square miles with a population of 1,508. According to the U.S. Census Bureau, 84% of Hispanic Buttonwillow families receive food stamps or Supplemental Nutrition Assistance Program (SNAP), and 43.5 percent live below the poverty line (US Census Bureau, 2014). Buttonwillow is a rural farming community, with few other sources of employment. The Buttonwillow Union School District (BUSD) is a K-8 district serving 342 students, 65% of whom are English learners. BUSD is eligible for funding under ESEA’s Rural Low-Income School (RLIS) and Small Rural School Achievement (SRSA) Programs. The families the district serves are mostly Hispanic (92%) and 97 percent of students receive free-and-reduced price lunch.

The Lamont Elementary School District (LESD) is located 13 miles outside of Bakersfield, CA. It is a 2.0 square mile farming community with 15,120 residents. While not designated as rural by the U.S. Department of Education, Lamont is a farming community with limited access to resources. Ninety-five percent of residents are Hispanic, with a significant portion of its population working as farm laborers. Lamont’s per capita income is the lowest in Kern County. According to the Census Bureau 70 percent of Lamont’s population is 200 percent below the federal poverty level. The LESD is a K-8 district serving 2,933
students, 62 percent of whom are English learners. Over 97 percent of students are eligible for free and reduced lunch.

The Semitropic Elementary School District is a rural agricultural and oil production community located 38 miles northwest of Bakersfield, CA. It is an unincorporated community named after the Semitropic Oil field. SESD is a K-8 district serving 627 students, 36 percent of whom are English learners. Over 54 percent of students are eligible for free and reduced lunch. SESD is eligible for funding under ESEA’s Rural Low-Income School (RLIS) and Small Rural School Achievement (SRSA) Programs. There are no stores or resources in Semitropic, as the community is on the fringe of a larger rural town, Wasco, CA. The school district truly is the only resource for many families in this small isolated farming and oil community.

Needs Assessment of partners in the eligible partnership

Based on a needs assessment, all three districts qualify as high-need LEAs. All three serve a high number of low-income families. Based on 2009 Census data, two of the districts, BUSD and SESD, meet both the Small, Rural School Achievement (SRSA) program and Rural and Low-Income Schools (RLIS) eligibility requirements. All three districts suffer from high annual teacher turnover rates, and rank in the top quartile for students eligible for the free and reduced price school lunch. Students from the three school districts struggle to meet proficiency on the California Standards Tests (CSTs). The CSTs measure the achievement of California content standards in English language arts, mathematics, science, and history-social science for grades 2-11. All three districts are among the lowest achieving in the state. The chart below shows that over half of all students district wide for each subtest score below the 50th percentile.
For English Learners, the achievement gap is even larger.

**Teacher Need:** In order to improve the achievement of students in all three districts, difficulties recruiting and retaining teachers in rural districts must be addressed. According to Buttonwillow Superintendent, Stuart Packard, “we will hire a credential student as intern/emergency hire and invest the time and resources only to have them leave the district once they complete their credential.” All three districts have a high annual teacher turnover rate. GRÖ STEM will support these high-need LEAs by building and sustaining a pipeline of qualified teachers prepared to teach in rural schools.

### Teacher Attrition by District

#### 2011-2014

<table>
<thead>
<tr>
<th>School</th>
<th># of teachers to leave</th>
<th>Percentage of attrition</th>
<th>District Percentage</th>
</tr>
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<tbody>
<tr>
<td>Semitropic School, N=10</td>
<td>3</td>
<td>33%</td>
<td>Semitropic 33%</td>
</tr>
<tr>
<td>Buttonwillow Elementary, Buttonwillow MS, N=16</td>
<td>5, 3</td>
<td>38%</td>
<td>BUSD 50%</td>
</tr>
<tr>
<td>Alicante Lamont Elementary, Mt. View, N=103</td>
<td>5, 8, 5, 3</td>
<td>13%</td>
<td>LESD 20%</td>
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*Data gathered from district employment data*

To meet the demand for teachers, SESD recently hired five intern teachers. California offers an intern option that allows individuals to be the teacher of record while completing an organized professional preparation program. An intern teacher is one who is still in teacher preparation, thus not highly qualified under No Child Left Behind.
As an eligible partnership, GRŌ STEM will implement a rural residency program in one of the most high-need areas in the nation and incorporate best practices from the Urban Teacher Residency United (UTRU) to recruit and retain highly qualified teachers for rural communities.

**Assessment of resources available to the eligible partnership.** Each partner brings to the partnership unique resources, including grant funds, financial support, supplies, technology, and expertise. These resources will help to sustain the program after funding ends. LEAs have afterschool and summer funding models that will support the integration of STEM into the curriculum. LEAs will also provide staff and administrator time to the project at no cost to the grant. Through prior TQP funding, technology equipment and expertise is already established. The partnership will also continue to apply for grants to support the goals of the project. CSUB faculty will support the project by using empirically-based practice and scientifically valid research on teaching and learning.

**Past Teacher Quality Success:** In 2009, CSUB’s Teacher Education Department received a Teacher Quality Partnership grant that brought together a collaborative of three Institutions of Higher Education (IHE), two County Offices of Education, and 10 high-need local education agencies (LEAs). The partnership reformed teacher education coursework and fieldwork experience. Sustained program accomplishments from the 2009 TQP award include reformed single and multiple subject credential programs, implementation of the co-teaching mode, and integration of innovative classroom technology. CSUB’s reformed program will prepare Residents to teach and meet the needs of 21st Century learners. With past TQP funding, technology resources such as iPads, whiteboards, and laptops were purchased. The partnership will have access to these technology resources, ensuring that Residents, district teachers, and students are prepared with state-of-art classroom technology.
B.1. Quality of the Project Design

   (1) CSUB is applying for Absolute Priority Two - establishment of Effective Teaching Residency Program. Our focus will be on a 15-18 month program that culminates with Residents receiving a multiple subjects credential with a master’s in Curriculum and Instruction and the ability to pass the CSET in either Foundational Mathematics or Foundational Science. Residents will be “in residency” from the beginning of the summer term of year 1 until they complete their master’s culminating event at the end of summer term of year 2. Residency is defined as spending four days a week in a LEA classroom from the beginning until the end of the teacher workday, emulating research from Urban Teacher Residency programs.

B.2.i. Strong Theoretical Foundations

   Residency models, such as Urban Teacher Residency United and the proposed GRŌ STEM Residency Partnership Program, rest upon the underpinnings of strong theory. Residencies acknowledge the need and provide the opportunity for extended clinical practice in combination with pertinent coursework. They build effective partnerships among Resident cohorts, mentors, and school districts, and promote teacher leaders in the professional community (Berry et al., 2008).

   Within GRŌ STEM, Residents will be simultaneously exposed to abstract theory of practice within their courses and the concrete classroom application of those theories as co-teachers in authentic classrooms. In doing so prior to becoming a teacher of record, attrition levels decrease. “Statistics show that 85% of all Residency graduates stay in their schools beyond those crucial first three years, reducing the high teacher turnover rates that cost districts millions and leave students in the dark” (Berry, Montgomery, Snyder, 2008)

   Residencies build partnerships and a community of practice through employing cohorts
and providing Mentors as support. **Distribution of cognition** is a term used to describe the notion that a group will gain and glean more knowledge through social interactions with each other than an individual member can on his or her own (Putnam, Borko, 2000). The GRŌ STEM program embraces this ideology by infusing the cohort model into the program and having all Residents participate in professional learning communities (PLCs), both horizontally (educators of the same grade level and content) and vertically (teachers of different grade levels). In accordance with previous findings, the PLCs created within the GRŌ STEM residency will continue into the professional careers of the program completers. “Residency programs also boast an active alumni network—a group that values ongoing training and collaboration, and serves as a resource as graduates pursue further professional development.” (United UTR, 2013)

**B.2.ii.iii. Quality, Intensity, and Duration of Training and Professional Development in the Field**

**Goal 1**

Establish a 15-month residency program that prepares Residents, in cooperation with the partner districts, to develop, teach, and assess high quality STEM curriculum in rural, high-need schools through a co-teaching experience beginning with a summer STEM academy, completion of a multiple subjects credential, and culminating in a masters research project.

Objectives:

1a. **95% of Residents** in the GRŌ STEM Residency Partnership Program will attain initial certification/licensure by passing all necessary certification/licensure assessments and attain their initial license. This includes passage of all four CalTPA assessment tasks and the RICA...
(Reading Instruction Competence Assessment®).

1b. 95% of Residents in the GRŌ STEM Residency Partnership Program will be trained to integrate technology effectively into curricula and instruction, including technology consistent with the principles of universal design for learning as measured by their technology portfolio.

1c. 95% of Residents in the GRŌ STEM Residency Partnership Program will be trained to use technology effectively to collect, manage, and analyze data to improve teaching and learning for the purpose of improving student academic achievement as measured by successful completion of their technology portfolio and passage of CalTPA Task 3.

1d. 100% of Residents in the GRŌ STEM Residency Partnership Program will participate in a year-long clinical experience in a GRŌ STEM partner district school site, as measured by attendance and successful completion of their credential program.

**Outcomes:**

This project will be a 15-month long residency in which the Resident will work with K-8 students continuously from the summer of year 1 through the end of the summer of year 2. Upon completion, the GRŌ STEM Resident will earn a multiple subjects credential that will allow the Resident to teach grades K-6, a master’s degree in Curriculum and Instruction, and the option to take the state examination to teach foundational science or math for grades 7-9.

Coursework will consist of weekly face-to-face classes, monthly Saturday events, and online coursework. Residents will connect with the curriculum through group activities, online tools, group and individual projects, and faculty-facilitated instruction. By participating in this collaborative partnership, district teachers and residents will gain valuable hands-on experience and utilize a revised form of student teaching fieldwork called co-teaching, based on the work of St. Cloud University. Co-teaching is defined as two teachers (cooperating teacher and teacher
candidate) working together with groups of students, sharing the planning, organization, and delivery and assessment of instruction, as well as the physical space.

**Program description:**

All Residents will begin their program participating in a set of weeklong extensive professional development seminars collectively called LaunchPad. The focus during the LaunchPad seminars will be on the following five topics: English Learners (ELs), strategies for teaching culturally diverse classrooms, strategies for working with students with disabilities, classroom management strategies that build a growth mindset, and co-teaching strategies that prepare the Resident to work with a cooperating teacher mentor. Residents will start learning and applying the precepts of Mindset and grit during LaunchPad. They will begin reading “Mindset: The New Psychology of Success” by Carol Dweck and “How Children Succeed: Grit, Curiosity, and the Hidden Power of Character” by Paul Tough. These books will be used during the first summer’s arch as the basis for group discussions around the Resident’s experiences. As Residents explore their own mindsets, they will begin the process of learning how to change a fixed mindset in their students to a growth one. Mindset and Grit will continue as a thread throughout the entire program. Residents will also master the technology that will be used during the upcoming STEM summer camp, BLAST! This program will bring approximately 500 4th-8th grade students to the CSUB campus for a three-week STEM camp experience. The students will come from the three partner districts.

*Activities and strategies adeptly coordinated with current CSUB teacher preparation, ESEA, and IDEA.* In preparation for BLAST!, the secondary goal of LaunchPad will be to build the cohort’s interconnectedness and team spirit while learning STEM activities that will be used during the camp. The week-long LaunchPad will last for 40 hours and count towards the required
credits for the credential. During the summer LaunchPad, the candidates will meet with their full-time faculty mentor. The faculty mentor will be responsible for the supervision of Residents as they learn to teach and present lessons, facilitate afterschool seminars that respond to the daily events in the Residents’ classrooms, and represent the Teacher Education Program at the LEA site. One faculty mentor will be assigned to the Lamont District Residents, and one faculty mentor will cover both the Buttonwillow and Semitropic Residents. The faculty mentor will ensure that all activities are consistent with state credentialing reform efforts and national strategies under IDEA. Following the LaunchPad experience, all GRŌ STEM Residents will participate in interactive fieldwork during BLAST!.

BLAST! acts as two bookends of our GRŌ STEM Resident partnership. Students from all three partner districts will experience a real college campus and participate in experiential learning opportunities modeled after real University STEM lab work. These activities will be facilitated and taught by co-teaching teams (CSUB Residents and district teachers). Activities and lessons for BLAST! will be designed in collaboration with content (math, science and engineering) faculty from CSUB.

During their first year at BLAST! GRŌ STEM Residents will co-teach in a classroom headed by a lead teacher from one of the partner districts. The following year, as the initial cohort of GRŌ STEM Residents are in the final months of their program, Residents will become part of the lead teacher group, beginning their program as a pre-teacher candidate and finishing as a teacher leader.

Building on their LaunchPad experience, Residents will meet as a cohort each day after BLAST!. These meetings will be a continuation of their coursework as well as a debriefing session where their faculty mentor will moderate discussions on the day's events. The dual
themes of Mindset and Grit will continue as Residents share successes and solutions to problems connected to the curriculum, ELs and individuals with disabilities, classroom management, student motivation, technology use, and co-teaching. Each session will start with a round-robin sharing using a Plus/Delta model in which success and opportunities for growth will be discussed. The faculty mentor will plan additional activities designed to further the Residents’ application of the techniques they are learning during LaunchPad and BLAST!. Case studies and hypothetical situations will be used, as well as role-playing activities that strengthen the Residents’ growth.

Following BLAST! an additional three weeks of coursework will complete the summer quarter. The Residents will participate in pairs training with their newly assigned cooperating teacher mentor. The cooperating teacher mentor is one of the two teachers in whose classroom the Resident will reside during the residency period. This one-day professional development is designed for the Resident and the cooperating teacher mentor to begin the relationship they will carry into the classroom and prepare the pair with tools for how they will successfully work together to maximize student achievement.

While participating in the summer session, GRÖ STEM candidates will be introduced to the CalTPA assessment process. The final assignment for the summer session will be the completion of CalTPA Task 1: Subject-Specific Pedagogy. In Task 1, Residents demonstrate their knowledge of the principles of content-specific developmentally-appropriate pedagogy. Each Subject-Specific Pedagogy task version contains four case studies that address subject-specific and developmentally-appropriate pedagogy, assessment practices, adaptation of content for English learners, and adaptation of content for students with special needs (disabilities), aligned to strategies recommended through IDEA. The LaunchPad and post BLAST!
By the end of the summer, each Resident will have completed an integrated course cycle that includes credit for four courses that include the major themes of Teaching English Learners, Classroom Management, Differentiated Instruction, and some parts of Sociocultural Foundations of Education. Additionally, they will have explored working with students with disabilities, uses of educational technology, development of STEM lessons, collaboration with peers and educational professionals (LEA teachers, administrators and IHE faculty).

The academic school year

The first day that the partner school’s teachers report for work will be the GRŌ STEM Residents’ first day of their fall semester. The Resident will shadow the cooperating teacher mentor (CTM) during the district’s pre-service days and participate in the preparation of the classroom for new students. Once school is in session, the Residents will be in their assigned K-8 classroom Monday through Thursday for the entire school day. The Resident and the CTM will practice co-teaching strategies supported by a faculty mentor and a LEA site mentor. The faculty mentor will observe the Resident in co-teaching situations and in solo teaching, support the development of high quality and content-rich lessons, and provide real-time feedback, in order to build continuous improvement into the program.

Residents will prepare a total of five lessons during the first semester that they will teach and be evaluated on by their faculty mentor. For the fall semester, all five lessons can be co-taught with their CTM. A variety of co-teaching strategies will be demonstrated.

During the fall semester, the Residents will attend their credential courses either on the Lamont campus or one of the Westside campuses (Buttonwillow, Semitropic). The Residents will continue the development of classroom management, student motivation skills, and STEM activity knowledge. Ninety percent of the credential coursework will be at the school site. Face-
to-face coursework will be provided on Thursdays after the school day is over and on Fridays. One Saturday a month, the entire cohort will meet at the CSUB campus to participate in professional development around upcoming learning projects and activities that are part of the LEA curriculum. All LEA teachers will also be invited to these Saturday events. The faculty mentors, LEA mentors, and the Educational Coordinator will be responsible for the planning, logistics, and implementation of the Saturday events called Saturday Flights.

The purpose of the Saturday Flights will be to model lessons and activities that are part of the upcoming curriculum. As part of the professional development, Residents and LEA teachers will explore and develop the co-teaching strategies that will be used during the actual teaching of these lessons and activities. It will be an opportunity to fine-tune the lessons before presenting them to students, and to strengthen STEM content knowledge and the teaching skills of elementary teachers. One Saturday Flight a semester will be dedicated to implementing literacy programs developed by CSU Center for the Advancement of Reading that incorporate the essential components of reading instruction.

Simultaneously, during the fall semester, the Residents will begin their online coursework towards their master’s degree (the 5000 level credential courses also count towards the master’s program requirements). The four core courses will be online for the GRÕ STEM candidates. The first course is Teaching and Diversity for Social Justice, which will build on their summer experience and the current semester's field experience.

The Resident will begin and complete CalTPA Task 2: Designing Instruction during the fall semester, and begin CalTPA Task 3: Assessing Learning (AL). Assessing learning will be covered in detail during the winter intersession. The Residents will explore the use of various technologies for data collection and analysis, along with ways to display data to a variety of
audiences: their students, parents, administration, and the media. Residents will also take the online course on curriculum theory and development, which will support their work in their LEA placement in the spring.

**After School Programs**

The LEA partners house afterschool programs, which provide candidates with an opportunity to develop and teach STEM lessons. Residents will participate in the afterschool programs Monday through Wednesday, allowing them to work with students in a different educational setting and to practice the skills and strategies they are learning.

**Phase 2 of the Credential program**

Upon analysis and evaluation of the placements up to this point, Residents will switch their placement with another resident. This will reduce the need to train additional cooperating teacher mentors midstream and provide the Resident with exposure to both primary and intermediate grade levels. All cooperating teacher mentor/teacher candidate pairs will be observed and monitored throughout the residency; if needed, the LEA mentor or faculty mentor will assist any partnership that may be struggling. Should a partnership need to be reconstituted or dissolved, the PI, in consultation with the Core Management Committee, will make the decision.

Once placed in a second classroom (the Residents will have already met with their new cooperating teacher mentor prior to the Spring semester beginning), the Resident will continue to utilize the co-teaching strategies, but with more opportunities to be the lead teacher during class instruction. Solo teaching experiences will be added once a week until the last three weeks of the semester, when the Resident will take full responsibility of the classroom. Support from the cooperating teacher mentor, the faculty mentor, and the LEA mentor will continue during this
time. Early in the semester, the Resident will complete CalTPA Task 3 on assessment, and begin to plan and implement the 4th and final CalTPA Task, The Culminating Teaching Experience.

For the online portion of the master’s program, Residents will complete a course in Educational Leadership while developing their leadership skills during the LEA afterschool program with their Faculty mentor and LEA site mentor, preparing them for the lead teacher role they will assume during the upcoming summer BLAST!

Residents will begin their study of research design and assessment and apply this knowledge to the design of their culminating research project. All Residents will be encouraged to do their research project data collection during the summer BLAST!. Residents will be introduced to the concept of thematic research projects and encouraged to work together on the design and implementation of their projects.

**Additional aspects of the of the master’s program:**

All the methodology courses for the credential program will be counted towards the master’s. Each methodology course will require a literature review and a mini-action research project. These will build the Resident’s confidence in the research and reporting aspect of the master’s program. The teacher/master’s candidate will continue their residency at the school site into the second summer’s BLAST!. Key components of the rigorous master’s program are: (a) Master’s core course work all online with Quality Matters qualified instructors, (b) action research at school site, (c) onsite faculty mentor to support research design and implementation, (d) final culminating master’s project done at the resident’s school site and (e) support in the development of thematic research projects that involve all three sites.

Concurrently during the spring or second semester, Residents will take the second half of their Literacy and Arts for the Diverse Learner course, the second half of their integrated
math/science methods class which will have an emphasis on engineering, and continue their study of the uses of technology in fostering student achievement.

As the Residents progress through the core masters classes and their methodology courses, they will take on more responsibilities in the finding, presenting, and modeling of the upcoming lesson activities during the Saturday Flights. This transfer of responsibility will be part of their master’s program and will be facilitated by their faculty mentor and the Educational Coordinator. Residents will begin to use the research they are conducting in their core master’s courses to develop appropriate curriculum, lessons, and activities for their residency classrooms and to share during Saturday Flights.

Goal 2
Develop teachers who promote the critical factors for success in the 21st Century of grit, tenacity, and perseverance through effective teaching that closes the achievement gap of high needs rural students through the use of Common Core State Standards and the Next Generation Science Standards.
Objectives:
2a. Each year of the grant, there will be a 5% growth in the aggregate learning outcomes of students taught by GRÕ STEM partnership completers. This growth will be measured by an aggregate score based on a combination of end-of-year state assessments, pre-post common benchmarks assessments, and an analysis of student work.
2b. Each year of the grant, there will be a measurable growth in the number of students that report a growth mindset towards STEM learning and professions, as measured by student responses to a Mindset survey.
2c. By the end of their program, Residents in the GRÕ STEM residency partnership program
will demonstrate an overall average rating of “strong” or above on supervisor's observations of their teaching of CCSS and NGSS lessons as measured by the C3 tool.

2d. 95% of Residents in the GRÖ STEM residency partnership will pass with a 3 or 4 on their CalTPA on their first attempt.

**Outcomes:**

Residents in the GRÖ STEM residency partnership program will develop the competencies necessary to create CCSS and NGSS based lessons that support student achievement in STEM content. Residents will have a usable knowledge of the theories of Mindset and Grit and will be able to assess their students in these areas and develop ways to increase the growth mindset, which in turn builds student grit, by the end of their residency program. These outcomes will be insured through the use of coursework, professional development of the Residents and LEA teachers, and collaborative activities to enhance teaching skills.

**Program design:**

*Preparing new teachers to understand and use research and data to modify and improve classroom instruction.* GRÖ STEM embraces the national shift to curriculum that Common Core State standards (CCSS) represents and that requires all students to apply knowledge at a deeper level than previously required.

High standards that are consistent across states provide teachers, parents, and students with a set of clear expectations to ensure that all students have the skills and knowledge necessary to succeed in college, career, and life upon graduation from high school, regardless of where they live.

California, along with 25 other states, has also adopted the Next Generation Science
Standards (NGSS) and framework. Published in 2013, they too require K-12 students to have a much deeper knowledge base and the ability to apply this knowledge through the use of scientific practices in use in the field today.

Using a multipronged approach, Residents in the GRÖ STEM program will learn effective teaching strategies and methodologies that will enable them to start reducing the achievement gap during their year-long clinical experience. The Residents’ first exposure to the CCSS/NGSS will be during LaunchPad. As they begin the second stage of their coursework during BLAST!, focus on the standards will intensify and be infused throughout their learning. They will learn the eight Standards for mathematical practice, which “describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.” (CCSS 2013). They will internalize the College and Career Readiness Anchor Standards for Reading, Writing, Speaking and Listening and for Language from the ELA standards. They will be introduced to the three dimensions of the NGSS that are combined to form each standard: Practices, Crosscutting Concepts and Disciplinary Core Ideas. The CCSS and the NGSS will be infused and integrated in every course throughout the GRÖ STEM program. Residents will also participate in mock lesson study activities based on lesson study procedures.

The lesson study model will be carried into the fall and spring semesters between cooperating teacher mentors and other LEA teachers in conjunction with Residents. Lesson study is a cyclical model in which a lesson is collectively developed by the Resident(s) and CMT(s), and then presented in an authentic classroom of one of the participating Resident and CMT pairs. The cohort will observe the lesson delivery, reconvene to discuss their observations, reflect on strengths/challenges, and revise the lesson appropriately. At this time, the lesson may be brought to a new class for a second observation and a report will be generated on the process’s entirety.
Professional Development

High quality professional development that strengthens content knowledge and teaching skills for Residents and current classroom teachers. The PD training will provide an interdisciplinary approach to content and learning. Residents will receive content support and coaching in STEM and training on instructional models, including the eight mathematical practices and the three dimensions of the NGSS that are combined to form each standard: Practices, Crosscutting Concepts, and Disciplinary Core Ideas.

The PD model that will be adapted and used by GRÕ STEM is the Kern High School District (KHSD) model of Common Core professional development. In the KHSD model, Residents and LEA teachers receive content support and coaching in mathematics and technology, as well as training on instructional models including the eight mathematical practices. GRÕ STEM will adapt the model to include Science and Engineering. Residents and teachers will work in teams with CSUB faculty to develop STEM anchor tasks. An anchor task cements the content in the students’ minds as well as begins the conceptual understandings of the STEM concept being taught. Originally developed for math tasks, the KHSD model will be adapted for all STEM tasks. (see appendix H for the model)

In conjunction with the above KHSD instructional design template, Residents will have exposure to the Engineering Design Process (EDP) and the traditional scientific method. A common EDP and the ones that the GRÕ STEM partnership will begin with are Ask, Imagine, Plan, Create, Improve. These steps will be incorporated into engineering specific anchor tasks developed during the course of the Residency partnership.

The traditional scientific method will be integrated into the PD model as well:
Observation Research, Hypothesis, Experiment and Review.

Similarities/differences between the three models will be discussed, compared, and analyzed. As Residents strengthen their understandings and use of the models they will be able to expand and apply them to additional anchor tasks and lesson design.

**Smarter Balanced Assessment prep**

California has collaborated with Smarter Balanced Assessments (SBCA), which has developed Common Core computer-based assessments using a variety of question formats, including multiple choice, short and extended constructed response, and performance tasks (Smarter Balanced Assessment Consortium, 2012). Of these, the performance task is the least familiar to most teachers (Heethuis & Hoyt 2013). By using the modified KHSD Instructional Design Template for an Anchor Task, CSUB faculty will guide Residents and district teachers through anchor task development, including the assessment for all STEM anchor tasks. A portion of the Saturday Flights will be focused on the development and modeling of the content of new anchor tasks.

**Academic Literacy**

The Residency Program will improve candidates’ and district teachers’ knowledge of effective literacy instruction in science and mathematics. Effective education in science and engineering must develop students’ ability to read and produce domain-specific text. As such, every science or engineering lesson is in part a language lesson, particularly reading and producing the genres of texts that are intrinsic to science and engineering (NRC Framework, 2012, p. 76).

Literacy training will be offered by the CSU Center for the Advancement of Reading (CAR). The Center serves the CSU system in its work preparing outstanding literacy educators.
for the P-12 schools. The Center facilitates faculty communication and research; disseminates research and policy information; fosters connections among the CSU literacy faculty, P-12 partners, and public education stakeholders; and serves as a forum for the interchange of public and academic interests. The Center’s co-directors served as lead authors of the new *California English Language Arts/English Language Development Framework*, which supports teachers in their implementation of California’s Common Core State Standards in English Language Arts/Literacy and English Language Development Standards.

The Center will sponsor activities designed to strengthen the literacy teaching skills of the Residents: (A) To implement literacy programs that incorporate the essential components of reading instruction, (B) To use screening, diagnostic, formative, and summative assessments to determine students’ literacy levels, difficulties, and growth in order to improve classroom instruction and improve student reading and writing skills, and (C) To provide individualized, intensive, and targeted literacy instruction for students with deficiencies in literacy skills.

*Furthermore, implications for English Learners and struggling/striving readers will be addressed in depth.*

Residents will develop a breadth of understanding of the purposes, strengths, and limitations of a variety of assessments, including screening and diagnostic instruments to determine students' literacy levels, strengths, and areas of difficulty; formative assessments tied to the curriculum; and summative assessments at the classroom, district, and state levels. Prospective teachers will work in teams with CMTs and university faculty to review data and determine appropriate classroom instruction (including individualized, intensive, and targeted intervention) to improve all students' literacy.

**Goal 3**
Build and sustain a pipeline of credentialed teachers through recruitment, mentoring, and induction support, who are committed to teaching in high-need rural school districts.

Objectives:

3a. Beginning in year 2 of the grant, 90% of completers who are hired will be retained in teaching in the partner high-need LEA or other area high-need LEA program one year after being hired by the high-need LEA.

3b. Beginning in year 2, 80% of completers will be placed in high-need areas (including special education, language instruction, and programs for limited English proficient students).

Outcomes:

Starting with a pilot group in January of 2015, ten highly qualified teacher candidates will be recruited to become GRÕ STEM Residents. This number will increase to 20 Residents in the second year of the grant. The last three years of the grant a minimum of 30 students will be recruited to the partnership. Residents will complete their program 15 months later. Following completion of their residency, Residents will be given three years of induction support through their faculty mentor. All completers will be placed in a high-need rural school in the partnership.

Recruitment:

The Residency program will serve the high-need partner districts through the recruitment of high-quality candidates, mentoring, and preparation of teachers. Recruitment and outreach activities will target undergraduate students, community college students, and career changers.

According to the Center for Teacher Quality, lower socioeconomic children and minority students are far less likely to be taught by qualified teachers. GRÕ STEM addresses this issue by establishing a partnership between the Residents and high-needs school from the onset, and by preparing the Residents to work with the exact student population they will be teaching once
they complete the program.

An additional focus of recruitment will seek out candidates that reflect the demographics of the student population, since cultural synchronicity has positive effects on students. Cultural synchronicity is the understanding that minority students benefit from being taught by minority teachers. Shared background knowledge due to similar life experiences has decreased the achievement gap of minority students (Villegas & Irvine, 2010).

Candidates will also be recruited specifically from CSUB’s undergraduate programs, including STEM and liberal studies programs. CSUB’s diverse student population makes an excellent candidate recruitment pool. In the Liberal Studies program at CSUB, there are roughly 600 students, half of whom are Hispanic. Recruitment efforts will target Liberal Studies students with an interest and aptitude for STEM. The GRŌ STEM Residency will host bi-monthly orientation sessions open to the community and undergraduate students. As CSUB provides the only Multiple Subject California Subject Examinations for Teachers (CSET) test preparation in Kern County, the prep sessions will serve as a recruitment opportunity.

In addition to CSUB’s traditional credential program admission requirements, the Residency Program will ensure a **rigorous selection procedures and service obligation that align with the district’s hiring goals.** Admission requirements include: 3.0 GPA; Passing score (TBD) on the Learning Mathematics for Teaching (LMT) or NGSS practice test; a 500 word essay; an interview with CSUB faculty, LEA administration and staff and the passage of the CBEST and CSET assessments.

Residents will be required to sign a service agreement outlining the residency requirements. The agreement will explain the commitment after the Residency to work in a rural high-need school. If the Resident does not fulfill service obligations, the partnership will request
the Resident repay the stipend.

**Mentorship:**

It is imperative to provide support to the Residents throughout their program. As mentioned before, the requirements to move students through the new CCSS and the NGSS require Residents not only to know and understand their content, but also to be able to share that knowledge with their students with depth and meaning. Mentors, therefore, are a key component to GRÖ STEM grant program. Research has shown (Zeichner (2010), Hobson, Harris, Buckner-Manley & Smith, 2012) that when mentors are key to the clinical experience, Residents increase their efficacy rates in helping their students meet academic standards.

During the course of the residency, Residents will have access to three mentors: a faculty mentor, an LEA mentor, and a cooperating teacher mentor (CTM). There will be a faculty mentor who supports activity, lesson and curriculum development, and implementation with a focus on the rural K-8 student. The faculty mentor will also be available for the PD of onsite teachers and administrators. The LEA will also supply a mentor who will coordinate with the faculty mentor professional development, the afterschool program, lesson study, and curriculum development and implementation. The LEA mentor will be responsible for working with the LEA’s cooperating teacher mentor as they implement co-teaching strategies in their classrooms.

The CTM will be the mentor with whom the Resident spends the most time. The Resident will be doing all co-teaching and field experience in the CTM’s classroom. The CTM will be selected with input from LEA administrators, the Educational Coordinator, the PI and the TED chair. Selection criteria will include pedagogy and content knowledge as well as instructional experience and involvement in pre-established PLCs.

During the residency, a CSUB TED faculty or Math/Science content faculty will be
actively engaged on the LEA sites weekly, working directly with the Resident and CTM either through assessment of the process (C3), modeling lessons, co-teaching (with the Resident or the CTM), or debriefing with students at the end of the day. The site’s faculty mentor will coordinate these visits with the LEA mentor.

The LEA mentor role will be to act as liaison between the LEA and the University, provide co-teaching support, and be an active part of the observation/evaluation process. The LEA mentor will work with the Residents providing information on school culture, school logistics, and the community. The LEA mentor and the IHE faculty mentor will work in partnership suggesting and planning appropriate and necessary PD for the Residents, CTM, and the teaching and administrative staff at the LEA.

A faculty mentor, a LEA mentor, and a cooperating teacher mentor may seem like mentor overkill, but this threesome will function as a wraparound team for each Resident. The Residents will get real-time feedback on their teaching skills and their instructional decisions on a daily basis. Each LEA and Faculty mentor will be selected through an application process by the CORE management in advance of the LaunchPad experience. Following selection the LEA and faculty mentor, candidates will go through an initial three-day mentor/coaching training modeled on a combination of the Masterful Coaching model developed by Robert Hargrove, the Comprehensive Mentoring Programs for New Teachers: Models of Induction and Support, based on the work of Susan Villani, and the Mentoring New Teachers Through Collaborative Coaching: Facilitation and Training Guide By Kathy Dunne and Susan Villani. These three resources will be used to develop the initial mentor training sessions and follow-up sessions throughout the academic school year. The centerpiece of the mentorship support will be the focus on rural education skills, techniques, and strategies.
Induction:

In California, a rich induction program for all new teachers already exists. In order to move the credential from preliminary status to clear status, every new teacher must participate in a two-year induction program run by either the district or other approved entity. The three districts contract with the Kern County Superintendent of Schools (KCSOS) office for their induction piece. BTSA provides two years of job-embedded structured support and professional development. With the support of trained Support Providers, Participating Teachers complete an inquiry-based formative assessment as they learn and apply new skills within the context of their own classrooms, with their own students. After successful completion of the Induction Program, Participating Teachers are recommended for a Clear credential” (KCSOS, 2014).

When GRŌ STEM Residents earn their credential and are hired by the LEA, and as they progress through the BTSA program, they will retain their GRŌ STEM faculty mentor as a support to their transition into the teaching profession. The faculty mentor will be in addition to the induction program provided by the district, in turn creating an induction support team comprised of BTSA support provider (KCSOS), a faculty mentor, and a CSUB faculty content expert. The GRŌ STEM mentor’s focus will be on supporting the new teacher in the utilization of the research skills and techniques learned during the master’s program. This support will lead the new teacher to perform action research with their students and to develop a plan for professional growth. The GRŌ STEM mentor will provide an additional layer of educational support and direction beyond that provided by BTSA. During the first two years of a full-time teacher’s career, the GRŌ STEM mentors will focus on establishing a community of practice within each of the participating LEAs. So as not to overburden the new teacher, the induction support mentor will ride alongside the ongoing BTSA support. The goal of the GRŌ STEM
induction support faculty mentor is to act as a bridge from the GRÖ STEM yearlong clinical experience to the first two years of teaching. They will continue to support the growth of the new GRÖ STEM teacher as a leader through specific leadership PD and connect the new teacher with new GRÖ STEM Residents. There is evidence that this type of peer partnership and professional collaboration has a positive effect on the Resident’s and the new teacher’s ability to close the achievement gap. (Trautwein & Ammerman, 2010)

The new teacher and the faculty mentor will use social media and other internet-based collaboration tools as a large part of the post credential support. Monthly video conference sessions with other graduates of the GRÖ STEM program will give the new teachers an avenue to share stories of success, areas of frustration and have a general question and answer opportunity. This will support and continue the idea of distribution of cognition where the cohort as a group benefits more than as separate individuals. All the previous mentors who supported the new teacher on the journey from Resident will also be part of the social media experience.

B.2.iv. Collaboration of appropriate partners for maximizing the effectiveness of project services

Goal 4

Enhance the administrative and teacher leadership skills of LEA administrators, teacher leaders, and Residents in rural, high-need partner schools through professional development that supports teacher leaders, site administrators, superintendents, university faculty, and doctoral candidates with research-based best practices that benefit partner districts’ school improvement and educational leadership efforts.

Objectives:

4a. Develop the capacity of teacher leaders, principals, and other leaders in distributed
leadership, mentoring, technology integration, and management approaches to increase achievement and teacher retention

4b. Enhance IHE and LEA facilitation skill development to support the collaboration process for PD, mentoring, and other capacity building efforts

4c. Develop a technology-enhanced induction and mentoring network that spans the career arc for teachers, teacher leaders, and rural administrators

4d. Produce and disseminate research findings and field-tested processes and products by GRŌ STEM partners and participants

Outcomes:

To enhance leadership skills of LEA administrators, teacher leaders, and teacher candidates while develop distributed leadership. Teacher leaders, admins and superintendents will receive mentoring, tech integration and management approaches to increase achievement and teacher retention. The partnership project in collaboration with the external evaluator will produce and disseminate research findings and field-tested processes and products.

School leadership is increasingly seen as “not doable,” with too many expectations to be met by one person. Students are more diverse than ever, and they continue to bring many of society’s problems to the schoolhouse door. Qualified teachers are harder to find, particularly in the areas of math, science, and special education, and technology plays an ever-increasing role in education. Safety will likely remain a top concern, and resource issues and creating time and space for professional development of administrators and teachers create obstacles to implement what we know are successful strategies. Perhaps most importantly, academic achievement is increasingly tied to the professional accountability of administrators.

Balancing these pressures with the emerging literature about factors associated with
successful leaders, Marzano and associates (2003) reviewed over 30 years of research about the effects of leadership practices on student achievement. After analyzing 5,000 studies, they identified 21 leadership responsibilities significantly correlated with student achievement and generated a “balanced leadership framework,” which the GRÖ STEM will use to reassess existing PD and academic preparation programs in the partnership. Effective leadership means more than knowing what to do; it means knowing when, how, and why to do it, as reinforced by Leithwood et al. (2008).

The GRÖ STEM partnership is designed to offer a range of services spanning a variety of participants, including those enrolled or preparing to enroll in school leadership programs leading to careers as superintendents, principals, early childhood education program directors, or other school leaders. GRÖ STEM will also support existing school-site leaders and superintendents of the high-need rural LEA partnership districts. Research-based professional development in various delivery modes, including web and hybrid technology, will be co-created and co-delivered across the partnership to better prepare leaders to improve the areas of student achievement, teacher and administrator retention, resource utilization, technology integration, networking infrastructure, assessment, and data use aligned to needs of high-need LEA schools.

Interstate School Leaders Licensure Consortium (ISLLC) guidelines will be used to ground the fidelity of efforts and ensure that national standards are met.

At the project school site level, each of the partner sites will generate logic models for annual review of the alignment of school-improvement plans and student-performance results. The Executive Council (see management plan) will review data and implement changes in light of these data-enhanced logic models and use this process to inform instructional decisions at the classroom, school, and network levels, as well as grant management. How to use data in this way
C.1 THE QUALITY OF THE MANAGEMENT PLAN

GRÖ STEM Management plan

The GRÖ STEM Partnership envisions broad and significant improvements to teacher education as it is conducted for Residents of CSUB in conjunction with three high-need LEAs in Kern County. In recognition of the scope and complexity of this undertaking, a project management organization and structure intended to achieve all the goals, objectives and outcomes of the project has been developed to meet all statutory reforms and improvements stipulated in the TQP grant application. The management plan will ensure that all grant objectives are done in a systematic and timely manner while meeting deadlines and upholding the quality of the partnership.

C.2.ii. Key Project Personnel

The three-legged stool the management plan will rest on is comprised of the following: the Program Management Team, the Core Management Committee, and the Executive Council.

The Program Management Team will be comprised of a PI, Co-PI, a Grant coordinator, and an Educational Coordinator. Dr. Randy Schultz at CSUB will serve as the grant’s Principal Investigator and grant administrator and will be responsible to the U.S. Department of Education for the achievement of project goals and objectives and the prudent use of resources to achieve project ends. The Co-PI for the project is Dr. P. Michael Lutz, tenured Professor of Mathematics and the representative for the School of Natural Sciences, Mathematics and Engineering. Both
Dr. Schultz and Dr. Lutz have worked on grants while at CSUB, the latest being the 2009 TQP partnership grant that reformed the teacher education credential program at CSUB. They will be supported by a Grant coordinator who will perform a variety of administrative, technical, and analytical duties related to budget, personnel, and operational functions under general direction of the GRŌ STEM PI/administrator. An Educational Coordinator will round out the Program Management Team and will be responsible for sustaining an environment of academic and professional excellence for the Residents and GRŌ STEM partnership members. Duties include a mix of Resident support, recruitment and scheduling of professional development, BLAST! and support of the partnership’s objectives.

C.2.1. Responsibilities, timelines, and milestones

The Core Management Committee

Informing the Program Management Team’s work will be the Core Management Committee. Responsible for overseeing the achievement of the project goals and objectives at the LEA partner sites, the core team will consist of the PI, the Co-PI the grant coordinator, the Educational Coordinator, two LEA mentor teachers (one from each side of the county), one faculty mentor, and a principal from one of the LEA sites.

The Core Management Committee will meet monthly during the life of the grant. Its function will be similar to a professional learning committee; it will look at relevant data collected on the success/issues of the project, determine areas of growth and areas of de-emphasis, monitor progress of the implementation plan and timeline, develop solutions for unanticipated problems, and act as the feedback loop for continuous improvement for the grant.

The Core Management Committee will be joined by the external evaluator(s) when meeting to act on recommendations and directions from the Executive Council. The Core
Management Committee in turn responds to direction from the Executive Council.

**The Executive Council**

The Executive Council will oversee the project, evaluate its effectiveness, and determine changes to be made to meet the stated goals and objectives. The Executive Council includes the members of the Core Management Committee, the superintendent from each LEA, a LEA CTM representative from each site, a LEA principal representative, a CSUB faculty representative, a Resident representative, a member from each of the three communities, and eventually a graduate of the program. This group will assure the quality of the program by reviewing reports of progress made by the evaluator and reports from the management team. The Executive Council will meet twice a year, once in early August and once in December. In August they will review current data on student achievement, Resident achievement, and overall program success. They will provide direction to the Core Management Committee and the partnership for the following year of the grant. In December the Executive Council will monitor each Resident’s success, faculty feedback, and LEA/IHE partnership. The work plan for achievement of the objectives of the proposed project on time and within budget, including clearly defined responsibilities, timelines, and milestones for accomplishing project tasks and mechanisms for ensuring high-quality products and services, is contained in Appendix H.

Anticipating funding at the start of October 1, 2015, Year 1 of the grant will begin with the hiring of the Grant Coordinator and Education Coordinator during the month of October. Recruitment will begin for the 1st cohort, which will be the pilot group. The 1st cohort will start in January, which is the beginning of the winter quarter of 2016. By intention, this cohort will be smaller than subsequent cohorts to allow the management team and the district partners to begin building the infrastructure necessary for the full program. Faculty will be piloting revised course
work that aligns with the STEM focus of this grant. This will also give the LEAs time to develop a cadre of teacher leaders and mentors who will support the partnership. The Core Management Committee will meet in twice in November and December in preparation of the launch of the pilot.

As soon as the Educational Coordinator is hired, recruitment will begin for the pilot cohort. The first cohort of ten teachers will participate on the Lamont campus. This will allow the grant to focus its resources in one place and then apply the lessons from the pilot to the full partnership. The LaunchPad activities for the first cohort will be during the winter intersession. The Core Management Committee will screen teachers for the cooperating teacher mentors (CTMs) role. Selected CTMs will go through their co-teaching training and participate in pairs training with their Resident during the first week of January before the LEA school starts back up after winter break. Coursework for the first cohort will still be presented at the LEA site. A selection process, in cooperation with the Core Management Committee, will be held for one faculty mentor and one LEA mentor for the Lamont site. Dr. Schultz will be responsible for the monitoring of the activities, timelines, and the budget during the pilot.

During the months of January through May 2015, the Educational Coordinator will recruit for the second cohort of 20 Residents, who will begin their program in June of 2015. The management team will plan the timeline and activities for the first summer’s LaunchPad and BLAST! Camp. The 1st cohort of GRÖ STEM Residents will be part of the planning process and will be developed into lead teachers for BLAST! In addition, teachers from all three partners will fill the rest of the needed class assignments for the BLAST! Camp.

In June, the second LaunchPad will take place followed by the first BLAST! The first BLAST! will have Residents from Cohort 1 and 2. Participating Cohort 1 Residents will take on
lead teaching roles and the new Cohort 2 Residents will provide support as co-teachers. The management team will be responsible for the timeline and activities for the first BLAST! Camp. The Cohort 1 students will continue with their program and complete it by March/April of 2016. Cohort 2 will finish their program by the end of June 2017.

C.2.iii. Feedback, Reflection, and Performance Data

The first Executive Council will be held in August of 2015. Preliminary data from the Cohort 1 and summer Blast! will be reviewed. Timelines, activities, budgets and logistics will be discussed and decisions made for the upcoming fall quarter and Cohort 2’s 20 students. Students in the Cohort 2 will be placed at the three partner districts, ten at Lamont, six at Buttonwillow and four at Semitropic.

Core management meetings will begin again in September, as will recruitment for the 30 students for cohort 3. Cohort 3 will begin in June of 2016 and will be the first cohort in the semester program. The following process will be followed for the remainder of the partnership:

1. Cohort recruited (between September – May of the current academic year)
2. Grant coordinator processes new cohort
3. Cohort attends LaunchPad – receives preparation for summer BLAST! Support
4. Previous Cohort takes on lead teacher role at BLAST! Newest cohort takes on co-teaching support role
5. Newest cohort participates in three weeks of summer courses post BLAST!
6. Previous cohort completes credential program and master’s culminating project.
7. August - Executive Council meets
8. Fall semester – new cohort begins co-teaching residency at LEA site
9. Fall semester – Educational Coordinator plans and implements professional
development (2) for all grant participants

10. Fall semester management team plans and implements Saturday Flights
11. Fall semester – Educational Coordinator begins recruitment for next cohort
12. Core management group meets September, October, November, December
13. Executive Council meets December
14. Fall semester- Intersession courses planned and logistics determined
15. Fall - Spring Semester courses and professional development planned
16. Intersession
17. Spring Semester starts
18. LaunchPad activities logistics and planning by management team and Core Management Committee
19. Return to step 2

As a cohort completes their credential and master’s work, the Educational Coordinator will begin the process of transferring them to the induction phase of the partnership. After Residents have secured their first teaching placement, they will begin their BTSA induction with their district’s BTSA provider. For those who are placed in one of the partner schools, this will be the Kern County Superintendent of Schools office. The faculty mentor from the residency will meet with the Resident and develop an induction support plan that will include cohort meetings, online activities, and collaborations via technology. It will be the responsibility of the Educational Coordinator to maintain contact with the residency completers for the next three years to ensure that they are teaching at a high-needs LEA partner district school site, or a high-needs Kern County school site if there are no open positions at one of the partner schools.

One additional aspect of the management plan is the independent evaluator. WestED is
providing evaluation services for the life of the grant and will provide us with an independent evaluator.

2.2.iii Ensuring Quality in Products and Services of the Project

Quality will be insured throughout the project by the checks and balances and the three-legged approach of the management plan. The Program Management team will meet monthly to review program successes, accomplishments, and the quality of the instructional materials used with the Residents (anchor tasks, technology, Mindset materials).

Quality of Project Evaluation

WestEd will evaluate the GRÖ STEM Program at CSUB. The evaluation will utilize both quantitative and qualitative data as appropriate and will be both objective and performance-driven. WestEd will collect and analyze quantitative data on GPRA, HEA, and GRÖ STEM project performance measures. We will collect and analyze qualitative data to contextualize and explicate quantitative findings, and maintain all data in a longitudinal database to gauge progress and allow for within- and cross-cohort comparisons. We will provide annual summaries of the quantitative teacher and student outcomes, including the GPRA and HEA performance measures, and will report progress on measures and evaluative findings to multiple audiences, including ED and program stakeholders, via Annual Performance Reports (APR), narrative reports, and timely memoranda and presentations to the project management team.

The evaluation approach will also employ a quasi-experimental design (QED) to assess whether GRÖ STEM results in improved teacher and student outcomes relative to traditional teacher preparation and induction programs. WestEd will compare findings on performance measures for GRÖ STEM participants with national and state standards of excellence in teacher preparation as well as with outcomes of other credentialing. The CSU Center for Teaching...
Quality (CTQ) will provide teacher candidate comparison group data at the CSU and state levels. The impact of teacher residency programs on teacher quality and student achievement is of import not only to CSUB but also to the CSU Chancellor’s Office. WestEd’s evaluation plan fits into a broader context for investments in teacher preparation programs in the 23 campus CSU system. Several CSU campuses have submitted proposals for TQP grants. In addition, CTQ, hosted by the CSU Chancellor’s office, has put in place longitudinal data collection on all CSU teacher candidates from the point of application to placement, and beyond. For this reason, the evaluation plan fits into a natural analytic frame that allows contrasts to be examined both within and across campuses. After the TQP awards are made, WestEd will collaborate with SRI International, also a proposed evaluator on several other CSU TQP grant applications, to identify opportunities to examine program contrasts and further data collection efficiencies that might be enabled through the TQP program.

Recruitment and selection. To gauge progress on recruitment and selection, we will assess project measures on recruitment targets; selection rates; candidates from underrepresented groups; candidates with STEM- and education-related backgrounds (based on prior employment, career path, major, advanced degrees, and granting institutions); GPA; California Subject Examination Test (CSET) results; ratings on selection criteria; declared subject matter preparation area and certification; motivations for selecting preparation via GRÖ STEM and teaching as a career; and attitudes and beliefs about teaching STEM subjects. These data will be collected from program documents and from candidates via annual surveys.

Teacher preparation. Measures assessed related to teacher preparation include GPRA Short-Term Performance Measure 1: Persistence: the percentage of program participants who were not scheduled to graduate in the previous reporting period and persisted in the
postsecondary program in the current reporting period. Data for this measure will be collected via GRŌ STEM archival program data. Project measures on teacher preparation will also assess candidates’ specific subject matter preparation area; similarity of mentor-candidate certification; quality of preparation (i.e., the extent to which different preparation components contribute to candidate perceived self-efficacy for teaching); candidate progression in teaching responsibility, as measured by time spent teaching and breadth and depth of instruction (e.g., lesson planning and teaching versus unit planning and teaching); and teaching practices learned as measured by pedagogical methods employed (e.g., instructional practices aligned to the Common Core or Next Generation Science Standards). Data on these measures will be collected via review of preparation program documents, semi-annual surveys of residency candidates and mentors, and mentor-candidate logs documenting residency activities.

In addition, the percentage of teachers trained (1) to integrate technology effectively into curricula and instruction, including technology consistent with the principles of universal design for learning will be assessed by examining teacher candidate’s successful completion of technology portfolios (95% target) and passing rates on California Teacher Performance Assessment (CalTPA) Task 3 (95% target).

Graduation and certification. GPRA and HEA each require measures related to graduation and certification. We will assess GPRA Short-Term Performance Measure 1: Persistence: the percentage of program participants who were not scheduled to graduate in the previous reporting period and persisted in the postsecondary program in the current reporting period (95% target). In order to determine whether degrees were obtained within the measure-specified time frame, archival data on degrees and specific teaching certifications (including authorized subject matter and grade spans) obtained by candidates and dates awarded will be
obtained from CSUB. We will also verify data on degrees and certifications obtained with those from CTQ. Next, we will evaluate findings relevant to GPRA Performance Measure 3: Improved Scores: the percentage of grantees that report improved scaled scores on assessments for initial State certification or licensure of teachers and the HEA measure, improvements in the pass rates and scaled scores for initial state certification or licensure of teachers. To address these measures, teacher candidates’ scores on the state licensure exams and the CSETs will be obtained directly from CSUB program documents and verified with data obtained from CTQ. Finally, achievement for prospective teachers (HEA) will be gauged through results from the CalTPA directly from the preparation program (5% annual growth target). Data will also be verified with data from CTQ.

**Placement.** In addition to requiring achievement for prospective teachers, HEA requires a measure on achievement for all prospective and new teachers, as measured by the eligible partnership. For new teachers, results from teacher evaluation protocols compiled by district human resources (HR) departments will be collected to assess achievement of new teachers. Data collection from HR departments will be formalized through data sharing MOUs between WestEd, CSUB, and partner LEAs (BUSD, LESD, and SESD). HEA also requires measures regarding hiring, subject areas taught, and placement in high need areas and schools. To address these areas WestEd will assess the percentage of highly qualified teachers: (1) hired by each of the three high-need LEAs participating in the partnership (90% target); (2) who are members of underrepresented groups (50% target); (3) who teach high-need academic subject areas of mathematics and science (100% target); and (4) who teach in high-need schools, disaggregated by the elementary school and secondary school levels among the three partnering LEAs (80% target). All data for these measures will be collected annually from GRŌ STEM and surveys of
its graduates and will be verified with data obtained directly from HR departments and CTQ.

**Teacher retention.** WestEd will assess HEA- and GPRA-stipulated measures of teacher retention. Specifically, the HEA measure of teacher retention in the first three years of a teacher’s career (90% target) will be assessed. Further, we will address three GPRA measures related to teacher retention: (1) Short-Term Performance Measure 2: the percentage of beginning teachers who are retained in teaching in the partner high-need LEA one year after being hired by the LEA; (2) Performance Measure 2: Employment Retention: the percentage of beginning teachers who are retained in teaching in the partner high-need LEA three years after being hired by the high-need LEA; and (3) Efficiency Measure: Employment Retention: the cost of a successful outcome where success is defined as retention of the teacher in the partner high-need LEA three years after the teacher is hired by the high-need LEA.

Annual retention rates using the initial number of graduates per cohort, not the number of teachers remaining in the cohort in the prior year, will be calculated. Data will be collected on an annual basis directly from BUSD, LESD, and SESD HR departments on all GRÒ STEM school and teaching placements to determine the number and percentage of retained GRÒ STEM teachers in each cohort. WestEd will also gather information on which teachers resigned from their teaching position or obtained a non-teaching position, as well as information regarding what new position within or outside the district the former teacher assumed. Analyzing these data will yield findings for all retention measures. Budget reporting of both grant and in-kind expenditures in APRs will provide the fiscal data necessary to determine the cost per successful outcome, i.e., a per capita cost, of teacher retention for three years after initial employment.

**QED to analyze student and teacher outcomes.** *Performance Measure 4: Student Learning:* the percentage of grantees that report improved aggregate learning outcomes of
students taught by new teachers will be assessed using a QED. The QED design will examine the learning outcomes of students taught by GRÖ STEM graduates, as well as select teacher outcomes resulting from participation in GRÖ STEM. The QED will be carried out in the final year of evaluation to address whether the GRÖ STEM model is more effective in preparing teachers compared to a traditional preparation programs. Waiting until the final year of evaluation will provide a maximize sample size by pooling data from all available cohorts.

Teacher outcome variables evaluated through the QED will be measures of teacher preparation drawn from the Survey of First-Year CSU Teaching Graduates and the Survey of School Principals and Supervisors of First-Year CSU Teaching Graduates (available through CTQ, and offering a basis for comparing GRÖ STEM teachers to teachers statewide in traditional programs), teacher performance as measured by the CalTPA, teacher placement in a high-needs school, and teacher retention. Student outcomes will include scores from English language arts (ELA) and mathematics Smarter Balanced assessments and future science assessments to be used in California (i.e., assessments based on the Next Generation Science Standards or the science California Standards Tests).

A central challenge in estimating the relationship between teacher residency programs and teacher and student outcomes is disentangling the effects of the program from the effect of participant selection. For example, does the program improve teacher instructional practice, retention in the profession, and student learning, or would the types of prospective teachers who apply and are admitted to the residency program exhibit these desirable outcomes no matter what type of preparation program they attended? This is a particular concern with teacher residency programs, which, while offering candidates small living stipends, often preclude the opportunity of working part-time and consequently tend to draw a relatively younger and more affluent
cohort of teacher candidates than traditional preparation programs. To address this threat of selection bias, WestEd proposes to utilize a Euclidean distance matching technique to identify an appropriate sample of candidates from traditional teacher preparation programs at CSUB.

The purpose of matching is to create groups that are equivalent on the observable pre-intervention variables known to be related to the outcomes of interest so that post-intervention differences can be causally attributed to the preparation program (Shadish, Cook, & Campbell, 2002). There are two other matching algorithms used frequently by researchers to identify comparison groups: propensity score matching and Mahalanobis distance matching (Guo & Fraser, 2010; Stuart, 2010). Propensity score matching is the most well-known method but requires a large sample size to reliably create well-matched comparison groups (Luellen, Shadish, & Clark, 2005). When the number of treatment teachers is small (as is the case with GRŌ STEM), scaled Euclidean and Mahalanobis distance matching are better options (Judkins, 2013). WestEd plans to use scaled Euclidean distance matching because it will provide the ability to more heavily weight the baseline achievement measures compared to the demographic variables when identifying matches. In addition, the evaluation team will utilize a one-to-many matching strategy (i.e., each GRŌ STEM teacher will be matched to multiple comparison teachers), if possible, in order to improve the statistical power of the analyses (Shadish et al., 2002). Once data has been obtained, the evaluation team will confirm that Euclidean distance matching is the most appropriate matching technique given the size and composition of the treatment group and pool of comparison teachers. WestEd will also consider Mahalanobis distance matching, propensity score matching, and propensity score weighting.

For teacher level outcomes, WestEd will identify teachers in traditional preparation programs as matches for GRŌ STEM teachers based on all available pre-treatment candidate
background characteristics, financial information, and program information that are available from the CSU application process. For student level outcomes, the pool of matched teachers will be further restricted by forcing exact matches on the grade level and subject of candidates’ teaching placement and additionally matching on the aggregate demographic and prior achievement characteristics of teachers’ placement classrooms and schools. For student outcomes, it is necessary to match on the characteristics of candidates’ teaching placement because GRŌ STEM prepares new teachers in multiple subjects and grade levels, and the scaling of the Smarter Balanced assessments and the future science assessments will necessitate limiting the pool of potential comparison teachers to teachers assigned to the same courses or grades as the program graduates. For example, comparison teachers assigned to grade 4 will be the only potential matches for program graduates teaching the same grade whereas comparison teachers assigned to Algebra I will be the only potential matches for program graduates teaching the same course. Additionally matching on the aggregate demographic and prior achievement characteristics of teachers’ placement classroom and schools will help to ensure baseline equivalence of student outcomes between students in GRŌ STEM and comparison teachers’ classrooms. This is particularly important given the fact that GRŌ STEM is designed to place teachers in high-needs schools.

Following the matching, the standardized difference in the teacher-level means (i.e., the mean difference between the treatment and comparison groups divided by the pooled standard deviation) for each of the continuous achievement measures used in the matching process will be calculated. This type of numerical balance diagnostic will determine the quality of the matches. In accordance with the What Works Clearinghouse (WWC; U.S. Department of Education, 2014) guidelines for baseline equivalence, we will investigate the possibility of identifying a
different potential pool of comparison teacher candidates if the differences between the treatment and comparison teacher candidates on the achievement measures are greater than 0.25 standard deviations.

Teacher-level impact analyses will pool outcomes across grade-levels and subject areas because the teacher outcomes (preparation, performance, placement and retention) are measured consistently across teachers. WestEd will compare outcomes for GRÖ STEM-prepared teachers to those of the matched sample using additional regression adjustment, controlling for key, pre-treatment, candidate-level characteristics. Since matching generally produces very similar, but not identical, treatment and control groups, analyzing the matched samples using regression models with additional controls helps minimize any bias due to inexact matching and is consistent with WWC guidelines (Rubin & Thomas, 2000; U.S. Department of Education, 2014).

For student outcomes, hierarchical linear modeling (HLM; Raudenbush & Bryk, 2002) will be used to account appropriately for the nesting of students within classrooms and schools. The benefits of HLM are well documented for calculating accurate standard errors and significance tests with nested data. However, given the research demonstrating that estimation problems with HLM are more likely to occur when the number of higher-level units (i.e., the number of classrooms) is below 30 (Maas & Hox, 2005), difficulties may arise with the proposed analyses for some of the courses or grade levels with fewer program graduates. If estimation problems do occur using HLM, the evaluation team will conduct regression analyses with a robust variance estimator that relaxes the assumption that the students’ scores are independent within classes (White, 1980). The student-level impact analyses will be conducted separately for each course and grade level. The impact analyses will include all of the variables used in the matching algorithm to select the comparison groups as control variables. After conducting the
individual student-level impact analyses, effect sizes based on each analysis will be calculated. The differences between the means for the students taught by program graduates and comparison students over their respective pooled standard deviations will be divided to calculate effect sizes (WWC, 2014). This standardization method means that each grade level difference will be based on standard deviation units, which allows the differences across courses and grades to be compared to one another. WestEd will use meta-analysis to calculate an overall impact estimate in each year of the grade by averaging the impact estimates across courses and grades (Lipsey & Wilson, 2001), to gauge the difference between the mean achievement for students of GRŌ STEM-prepared teachers and matched students of matched comparison teachers. Specifically, the team will determine if the difference is equal to or greater than an effect size of 0.20, after accounting for control variables. An effect size of 0.20 would be equivalent to the teachers moving their students from the 50th percentile to the 58th percentile while the comparison teachers kept their students at the 50th percentile (Lipsey et al., 2012). Furthermore, an effect size of 0.20 is likely attainable based on a review of impact estimates from studies on prior educational interventions (Hill, Bloom, Black, & Lipsey, 2008).

**Project implementation.** WestEd will also collect data on program implementation, including collaboration among partners, development of new curriculum, selection of mentor teachers, and the operationalization of the GRŌ STEM Residency Program. A clear understanding of GRŌ STEM will enable the evaluation team to suggest ways in which outcomes may be related to specific GRŌ STEM components, highlighting which components may be most critical, for whom, and under which conditions. Monitoring the implementation fidelity of an intervention requires a clear account of the model in theory, the particular context of implementation, and a nuanced and dynamic picture of what is actually happening. The
evaluation will attend to each of these three components. First, the evaluation will be grounded in a well-articulated logic model (See Exhibit 1). Second, program documents will be reviewed and key stakeholders will be interviewed to develop a meaningful picture of the GRÖ STEM context. Third, to assess the extent to which GRÖ STEM components are being implement, the evaluation team will interview LEA and faculty mentors, residents, staff, and Executive Council members using protocols with both open and closed-ended questions about how participants experience the program.

To facilitate acquisition of comparison teacher data WestEd will develop a data sharing MOU with the CTQ. Beginning in early 2014, CTQ began developing an integrated data collection system that consolidates several existing but previously unconnected data collection efforts across all 23 CSU campuses. The CTQ is implementing a longitudinal data system that compiles measures of professional educator practice as well as evidence of improved student learning into a coherent, centralized system. Data elements in the expanded CTQ database include many of the same elements we propose to collect via project surveys and program documents and archives. CTQ data elements are: (1) CSU program applicant data (e.g., undergraduate institution and GPA; CSET results; demographic information); (2) CSU program completer and credential data; (3) school placement data; (4) CSU Teacher Preparation Exit Evaluation results; (5) teacher retention data; (6) teacher performance assessment data; (7) annual Survey of First-Year CSU Teaching Graduates results; and (7) annual Survey of School Principals and Supervisors of First-Year CSU Teaching Graduates results. WestEd will use CTQ data to verify survey data, while relying on survey data to provide timely findings and feedback to CSUB.
### Inputs
- **CSU Bakersfield**
  - Faculty Mentor / Induction Support Mentor
  - TED or Math/Science content faculty
  - Program Management Team
- **Partner School Districts**
  - Buttonwillow Union
  - Lamont Elementary
  - Semitropic Elementary
  - Cooperating teachers
  - LEA mentors
  - Staff and administrator time
- **CSUB and District Partnership**
  - Matching funds and in-kind support for PD
  - Needs assessment results
  - Technology equipment and expertise from prior TQP grant
  - Core Management Committee
  - Executive Council
- **Kern County Superintendent of Schools**
  - Induction Mentor

### Program Model Resources
- Urban Teacher Residency
- United best practices
- CaTTPA assessment process
- Research on “Grit” (Duckworth) and “Mindset” (Dweck)
- KHSD Instructional Design Template
- KHSD model of Common Core PD
- Kolb’s Experiential Learning Cycle
- CSU Center for Advancement of Reading’s literacy programs
- Mentoring and coaching resources (Hargrove; Dunne & Villani; Villani)
- Interstate School Leaders Licensure Consortium (ISLLC) guidelines

### Activities

#### Products
- Develop Residency Program
  - Develop integrated math and science methods course
  - Develop CCSS/NGSS-based lessons based on K-8 student data
  - Develop data-enhanced logic models at each partner site
  - Implement management plan
  - Co-develop and deliver PD across CSUB and LEAs
- Integrated math and science methods course for teacher candidates CCSS and NGSS lesson plans
- PD trainings
- Recruitment
  - Targeted toward minority students, those with ties to rural communities, undergraduate CSUB students with interest/aptitude in STEM, community college students, and career changers
- Enroll 120 multiple subject credential and Master’s in Curriculum and Instruction students

#### Activities
- Candidates
  - Access to faculty mentor, LEA mentor, and cooperating teachers
  - Cohort model with professional learning communities
  - LaunchPad seminars
  - Interdisciplinary PD
  - Saturday Flights
  - On-site credentialing coursework
  - Co-teaching with increased responsibility over time
  - Placement in two classrooms of different grade levels
  - Online masters coursework
  - Action-research projects
  - Culminating Masters research project
  - Student Summer BLAST! Program
  - STEM Training
    - Summer STEM Academy
    - STEM After School Programs
    - Fab Lab
    - Integrated math and science methods course
- Mentors and Cooperating Teachers
  - Three-day mentor/coaching training for mentor candidates
  - Optional attendance at Saturday Flights
  - Web and hybrid professional development
  - Facilitation skills development

#### Teacher candidates with 600 hours of co-teaching experience
- Teacher candidates with 150 hours of experience working with K-8 students in Summer STEM Academy
- Teacher candidates with extensive STEM experience
- Teacher candidates with expertise on integrating and utilizing technology

### Program Delivery

#### Program Outcomes

<table>
<thead>
<tr>
<th>Short</th>
<th>Long</th>
<th>Ultimate Impact</th>
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</thead>
<tbody>
<tr>
<td>Candidates learn to integrate technology and data into curriculum and instruction</td>
<td>Candidates will pass the CaTTPA Tasks</td>
<td>Improvements in student</td>
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<tr>
<td>Develop CCSS and NGSS based lessons to support STEM achievement</td>
<td>Be prepared to complete a Foundational-Level Mathematics (FLM) or Foundational-Level General Science (FLGS) Credential</td>
<td>Learning outcomes</td>
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<td></td>
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<td>Academic literacy</td>
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<td>Mindset towards STEM learning and careers</td>
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<td></td>
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<td>“Grit” and “mindset”</td>
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**Program will**
- Increase achievement and teacher retention
- Develop technology enhanced induction and mentoring network spanning the career arc
- Build and sustain pipeline of credentialled teachers
- Enhance IHE and LEA facilitation skill development
- Produce and disseminate research findings and field-tested processes and products

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**Jalene, 1st Grade, 2023**

**Jalene, 2nd Grade, 2023**

**Jalene, 3rd Grade, 2023**

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**PR/Award # U336S140047**

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References


