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**‘Aha Pūnana Leo, Inc.**  
**Native Hawaiian Education Program, CFDA 84.362A**  
**Project Narrative**

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**A. NEED FOR THE PROJECT**

*(i) The magnitude of the need for services or activities to be carried out by proposed project.*

Despite efforts to increase access to high-quality educational settings for Native Hawaiian children in the past 20 years, they are still underrepresented in the population of preschoolers (EOEL, 2020). The rate of preschool attendance for Native Hawaiian children is 5 points lower than the statewide average of 54%, and notably lower than two higher-performing racial groups: Asians (65.1%) and Whites (60.8%) (US Census Bureau, 2018). This difference in preschool attendance may contribute to later achievement gaps as children who do not attend preschool, especially if they are from disadvantaged groups, are less prepared for kindergarten than their peers that do attend preschool (Chaudry, 2016). This puts Native Hawaiians at a disadvantage before they even begin formal schooling. Yet increasing preschool access for Native Hawaiian children, while important, will not fully address gaps in school readiness. Historically, even preschool-attending Native Hawaiian children have lower vocabulary scores than average: 19% of Native Hawaiians scored in the above average range compared with 23% percent nationally (Kamehameha Schools, 2014). These statistics highlight the importance of increasing both access to and quality of preschool settings for Native Hawaiian children.

Once Native Hawaiian children enter formal schooling, achievement gaps in math and reading persist and widen, leading to gaps in higher education attainment, employment, income, and health. In 2018, Native Hawaiian fifth graders’ reading scores were 10 points below the statewide average, and by Grade 10, they were 11 points below at only 58.6% proficient. In math, the differences are even greater. Native Hawaiian students’ proficiency rates were 12 points below statewide averages at Grade 3, and 15 points below statewide averages at Grade 10, with less than a quarter of students achieving proficiency (23.4%). Achievement gaps continue into secondary

and post-secondary settings. Less than 75% of Native Hawaiian students will graduate from high school in four years (compared to 80% of students statewide), and Native Hawaiian students are less likely to enroll in college than any other ethnic group (25.7% compared with 35.7% statewide (HIDOE, 2018). These statistics suggest that public education has failed to support Native Hawaiian students.

One result of this discrepancy in higher-education attainment is that most Native Hawaiians work in the construction and tourism industries instead of higher paying science, technology, engineering and mathematics (STEM) occupations (DBEDT, 2018). This is particularly striking given that traditionally, Native Hawaiians possessed a comprehensive body of scientific knowledge in areas ranging from agriculture and botany to marine biology and astronomy, supporting the discoveries of and survival in new places across the Pacific Ocean (Nguyen, 2016). The biggest failure of the existing educational system is an inability to position Native Hawaiians in higher paying jobs, demonstrating that new methods are needed so that all Native Hawaiians can achieve postsecondary, career, and life success.

One way to address these gaps is through early intervention prior to formal schooling. Native Hawaiian children not only need access to early education, but high quality, culturally relevant educational settings with highly trained teachers. High quality early education environments emphasize developmentally appropriate practices to build the physical, social/emotional, language, literacy, math and science skills of young children (Chaudry, 2016).

According to the research, early childhood mathematics is vitally important for young children's present and future educational success (Frye, et al., 2013; Jordan, et al., 2009). In fact, across all areas of kindergarten readiness, school-entry math is one of the highest predictors of academic success (Frye et al., 2013.). This research also demonstrates that virtually all young children have the capability to learn and become competent in mathematics, and young children

enjoy their early informal experiences with mathematics (Ibid). **Unfortunately, many children, particularly Native Hawaiians, may not have the opportunity to develop those early math-related skills and interests.**

Children's exposure to math in early education is often related to their teachers' skills in teaching informal math (Oppermann et al., 2016). **Yet studies find that preschool teachers do not have sufficient training to teach informal math.** A majority of preschool teachers have low efficacy beliefs in their ability to teach mathematics and report that they would teach mathematics ineffectively (Takunyaci & Takunyaci, 2014). However, in early childhood settings, exposure to math should be engaging and capitalize on children's natural curiosity, not requiring teachers to have advanced training in mathematical concepts. **Yet there are few resources or curricula that teachers can use to combine play, and the natural environment when introducing children to math.**

**Similarly, parents also lack the skills and resources needed to teach their own children math concepts.** In her research with immersion school teachers, Dr. Kukahiko (2014) found that "many Native Hawaiian parents may have had negative experiences with education, and mathematics in particular". Expanding on this observation, she notes that parents' "negative experiences have created a fear of mathematics that is then acquired by their children." Yet the research suggests that children's home-based math experiences positively predict their later math achievement and academic development (LeFevre et al., 2009; LeFevre et al., 2010). To support their children's math exposure, parents need basic mathematics knowledge and skills to provide a positive home environment for learning mathematics (Blevins-Knabe et al., 2007).

Taken together, the research shows that early math exposure is needed to address widening gaps between Native Hawaiian students and their statewide peers. Despite the fact that children demonstrate an interest in math well before they enter school, many Native Hawaiian children lack

the opportunity to develop the math skills they will need for future success. Yet the connection to nature is a key element of Hawaiian culture, which aligns perfectly with the recommendations for incorporating informal math around on children’s curiosity about the natural world. This alignment presents a unique opportunity to foster both a connection to Hawaiian culture and early exposure to math for young Native Hawaiian children through implementing culturally relevant math practices in preschool.

For many, the idea of imbuing math lessons with cultural relevance may sound odd. Like language however, mathematical constructions are inextricably linked to the way we view the world. “Mathematics is comprised of a diversity of practices that make it as historically, culturally, socially, and politically situated as any other human activity. It is grounded in human interactions with the environment and with one another” (Greer, et. al.,2009). Moreover, mathematics should be taught in a way that honors the unique educational legacy of Hawai’i and its people. **Yet few high quality and effective math curricula exist for preschoolers that incorporate a cultural approach. In fact, there is no prescribed curriculum for mathematics instruction in Hawaiian language environments.**

In order to address this need, teachers cannot simply begin to implement a culturally relevant math curriculum. Instead, system-wide changes are needed that begin with the school leadership. **Yet many school leaders or center directors lack the experience, training and education to develop a new curriculum, and adequately support their staff in the acquisition of new concepts and the delivery of on-going, embedded professional development.** To do so, they must have a deep understanding of the indigenous framework that guides all aspects of the organization. A profound experience for all leaders is participation in the accreditation process as it signifies a “deep dive” into the very foundation of the organization. The ‘Aha Pūnana Leo (‘APL) is accredited by the World Indigenous Nations Higher Education Consortium (WINHEC).

**At the ‘APL, 75% of school leaders have never gone through the WINHEC accreditation process, suggesting a gap in the leadership capability of the organization.** This skill set is necessary for large organizational changes to take place and become institutionalized. Center directors also need to connect with families and the community as a whole, which is critical to creating the most effective learning environment—particularly in Native Hawaiian communities. In working with parents and the community, center directors and program staff require knowledge and training in order to be strong advocates for early mathematical experiences for young children.

***(ii) Specific gaps have been identified and will be addressed by the proposed project.***

‘The ‘APL is a Statewide Hawaiian medium preschool system in Hawai‘i with centers on the five major islands and an ability to reach remote and rural areas, as well as low-income and economically disadvantaged families. The proposed project will build upon the success of their approach to literacy which involved building a Hawaiian medium curriculum. The next natural step is to develop a complementary math curriculum as Hawaiian language has unique attributes that support early math skills, like counting and sequencing. Moreover, the math curriculum will support literacy since all teaching occurs through the Hawaiian language. The following table summarizes how the ‘APL will address the needs of the target populations:

<b>TABLE 1. IDENTIFIED GAPS AND WEAKNESS ADDRESSED BY THE PROJECT</b>		
<b>Gap or Weakness</b>	<b>Magnitude</b>	<b>Addressed by Project</b>
<i>Native Hawaiian children may not have the opportunity to develop early math-related skills and interests. (pg. 3).</i>	Mathematics proficiency gaps between Native Hawaiians and statewide averages increase from 8.6 points in Grade 3 to 14.8 points in Grade 10.	<u>Create and pilot culturally relevant math curriculum for preschoolers modeled on a highly successful literacy curriculum and research-based strategies.</u>
<i>Studies find that preschool teachers do not have sufficient training to teach informal math. (pg. 3)</i>	A majority of preschool teachers have low efficacy beliefs in their ability to teach mathematics and report that they would teach mathematics ineffectively.	<u>Introduce and support mathematics pedagogy and integration with culture, language, and literacy for all instructional staff.</u>

<i>Parents lack the skills and resources needed to teach their own children math concepts. (pg. 4)</i>	Many parents themselves did not do well in math and may lack confidence or knowledge of how to engage their children in informal math.	<u>Develop online resources (e-books, animated books) for parents to support mathematics learning at home.</u>
<i>Few high quality and effective math curricula exist for preschoolers that incorporate a cultural approach. (pg. 5)</i>	There is no prescribed curriculum for mathematics instruction in Hawaiian language environments.	<u>Create and pilot math curriculum for preschoolers modeled on successful Hawaiian medium literacy curriculum.</u>
<i>Many school leaders lack the training or education to adequately support their staff in the acquisition of new concepts and the delivery of on-going, embedded professional development. (pg. 5)</i>	School leaders are responsible for implementing system-wide changes and connecting with families and communities. This is critical to creating the most effective learning environment – particularly in Native Hawaiian communities.	<u>Provide intensive leadership training for center directors to support curricular changes, continuous professional development of staff and family/community engagement.</u>

## **B. QUALITY OF PROJECT DESIGN**

### ***(i) Design is appropriate and will address the needs of the target population***

‘Aha Pūnana Leo (‘APL), a Native Hawaiian Educational Organization, seeks a Native Hawaiian Education Program grant to implement and evaluate the proposed project—‘Ōlika A Lau Ka ‘Ike, Knowledge Budding Forth and Multiplying with the goal to increase kindergarten readiness through improving preschoolers’ achievement in math and reading. Three key activities—expansion of the Hawaiian medium math curriculum; professional development for preschool teachers and center directors; and family engagement around early math learning—when delivered together, are expected to significantly impact our goal. The project goal is supported by the following objectives:

1. Increase math ability among preschoolers completing their final year at ‘APL by implementing a Hawaiian culture-based math curriculum (partially addresses CPP1).
2. Increase Hawaiian language reading ability among preschoolers completing their final year at ‘APL by integrating the Hawaiian culture-based math curriculum with the existing literacy

curriculum.

3. Support school readiness, particularly in literacy and math, among preschoolers completing their final year at ‘APL.
4. Increase the competency of ‘APL teachers in math instruction and assessment through intensive and embedded professional development.
5. Increase the competency of ‘APL school leaders through leadership training conferences, peer mentoring, and experiential professional development (partially addresses CPP2).
6. Increase family engagement by providing online and print resources to support early math learning.

Performance measures which anchor the proposed objectives and provide measurable evidence of progress can be found in the evaluation section. The project design stemmed from needs assessment and outcome data derived from previous grants serving the same target populations: Native Hawaiian preschoolers, their families, and the staff who serve them. Previous funded projects focused on supporting literacy skills through strengthening the literacy curriculum, creating professional development opportunities for staff, and supporting family engagement using online resources for strengthening literacy at home. The researchers demonstrated a positive correlation between these activities and students’ Hawaiian reading scores and kindergarten readiness in literacy: Hawaiian speaking children from ‘APL preschools were able to read two years earlier than peers in English medium schools. Similar results are expected from this mathematics program. Based on these successful outcomes, the proposed project design builds on these findings and applies them to the domain of math, supported by research in preschool mathematics, Hawaiian culture-based education (HCBE), professional development in math for preschool teachers, and family engagement using technology.

The ‘APL has a 37-year history of serving Native Hawaiians, and successfully addressing

their unique educational needs. The ‘APL has built much of their curriculum, taught entirely in ‘Ōlelo Hawai‘i (Hawaiian language), on traditional Hawaiian *mo‘olelo*. Mo‘olelo literally translates to story, but the meaning is much richer, including concepts like history, legend, genealogy, tradition, and reflects the oral tradition by which Hawaiians historically passed on culture and knowledge. Mo‘olelo in the curriculum are designed to not only teach Hawaiian concepts, but also incorporate the Hawaiian worldview embedded in the language (Krug, 2016). This deep commitment to HBCE, and the perpetuation of the language and the Hawaiian worldview speaks to the ‘APL’s ability to address the needs of Native Hawaiians. The following strategies were intentionally chosen and designed to address pressing needs among our target populations.

### **Activity 1: Math Program Development**

#### *Development of Math Curriculum Development and Assessment Tools*

In 2016, a group of experienced ‘APL *kumu* (teachers) gathered to discuss approaches to mathematics at the preschool level and created a draft curriculum called ‘*Anu‘u Ho‘okō Makemakika*. However, without funding and a shift in focus that emphasized literacy, the math curriculum was set aside. A renewed commitment to addressing gaps in math ability led to a need to continue work on developing a culturally relevant math curriculum for preschoolers, which forms the centerpiece of the proposed project. In line with current research, the curriculum will follow recommendations from the Practice Guide: Teaching Math to Young Children, published by Institute of Education Sciences (IES) and adopted by What Works Clearinghouse (WWC) (Frye et al., 2013). The guide provides evidence-based recommendations that address the challenges of teaching early math to children ages 3 to 6 and provides practical, clear strategies for teaching early math based on the best available evidence. Below is a discussion of the IES recommendations along with how the ‘APL will address them.

**Recommendation 1-** *Teach number and operations using a developmental progression.*

At the ‘APL *keiki* (children) will learn numbers both formally, as an actual math activity, and also informally, as a game or a supportive concept in a lesson that children are learning. Since ‘APL schools are Montessori-based, students have access to centers and stations that support them at different developmental stages, and allow them to engage in math activities that increase in difficulty as each skill is mastered. A component of this recommendation includes teaching *keiki* to “subitize small collections” which aligns with Hawaiian cultural number terms and sequencing. This alignment highlights the benefits of integrating Hawaiian language and evidence-based math teaching practices to create materials that are unique to this project and support a Hawaiian worldview.

**Recommendation 2:** *Teach geometry, patterns, measurement, and data analysis using a developmental progression.*

The current learning centers incorporate a variety of *ha ‘awina* (lessons) related to geometry, patterning, measurement, and data analysis that will be formalized in the proposed curriculum. For example, with geometry, there are centers that introduce 2D and 3D shapes. For patterns, *keiki* look at feather made adornments such as cloaks, helmets and *kahili* (feather standards), patterns in *kapa* (pounded coconut cloth) and more. For data analysis, *kumu* will create graphing *ha ‘awina* or lessons to compare data such as a favorite flower or fish, etc.

**Recommendation 3:** *Use progress monitoring to ensure that math instruction builds on what each child knows.*

‘APL schools use a variety of assessments that measure progress in academic knowledge and skills. For the literacy curriculum, they developed a tool called the Curriculum Based Measurement for Reading (CBM – *Heluhelu*) which is conducted three times a year and is specific to Hawaiian reading ability. It was tested for validity and reliability by an external evaluator.

Based on this model, a new tool will be developed called the Curriculum Based Measure for math (CBM – *Makemakika*). In addition, the *loilo pinepine* is a daily observation-based assessment used when keiki are working at the learning centers. This tool is used by kumu to gather information about each keiki’s skill acquisition beginning with the date the activity was introduced, the date the kumu saw the keiki practice the activity, and finally, the date the kumu saw that the keiki completed the activity correctly without any assistance. This tool is used for formative adjustment to instruction and is also incorporated in the parent-teacher conference reports (where adjustments can happen at home as needed). The schools also administer the bi-annual (pre-post) He Keiki Pūnana Leo Au (HKPLA), a tool comprised of eight constructs that are aligned with the values of the school and measures school readiness, important skills needed to succeed in kindergarten (and life). For the purposes of this project, we will use the construct for mathematical ability: U.6 –“He/She is able to compute addition and subtraction math problems.” Only Pūnua, preschoolers who are in their final year, will be tested.

**Recommendation 4:** *Teach children how to view and describe their world mathematically.*

In order to facilitate positive knowledge and attitudes about mathematics, the curriculum will be flexible and student driven. It will link mathematics to children’s daily experiences, cultural practices, and general interests, highlighting the purpose and usefulness of mathematics in daily life. This concept was modeled on the Te Whāriki, an evidence-based Early Childhood Education curriculum program developed by the University of Waikato in Aotearoa (New Zealand). This indigenous framework has been used throughout that country and has shaped early childhood education practice for over 20 years. The proposed curriculum will build upon a child’s natural interest and curiosity about the world and connect with traditional Hawaiian mo‘olelo so that children will learn to view and describe their world mathematically with a Hawaiian focus.

Kumu will develop unique ha‘awina (lessons) to support students and share them with other kumu at the professional development sessions described below.

**Recommendation 5:** *Dedicate time each day to teaching math, and integrate math instruction throughout the school day.*

The proposed mathematics curriculum will utilize the unique features of the Hawaiian language including its grammar and writing system by modeling it on the *hakalama*, a syllabic reading program combining early childhood cognitive development and Hawaiian tradition. The *hakalama* is part of the *daily* routine and incorporates song combined with syllabic exercises. Students see that languages are systems of symbols—an understanding crucial in developing skills in mathematics as well. The newly developed curriculum will follow this model, embedded in the daily routine, using proven effective techniques. The lead for this activity, [REDACTED] conducted her graduate research on curriculum development, instruction and assessment in mathematics. She will work collaboratively with a contractual position from Ka Haka ‘Ula O Ke‘elikōlani, College of Hawaiian Language (KHUOK) at the University of Hawai‘i at Hilo (UHH), Dr. William Wilson, a founder of the ‘APL, and a linguistics expert. They will complete the curriculum in Year 1 and pilot it in Year 2, making adjustments for full roll out in Year 3.

### *Professional Development*

In addition to curriculum development, best practices for pedagogy and daily activities will be shared among kumu to ensure the proper use of the Hawaiian language, especially as it relates to mathematics. This will be done at the bi-annual Hālāwai Nu‘ukia, a 2-day intensive statewide training targeting all instructional staff and provides an opportunity to introduce new concepts and curricula. The 3-day organization-wide ‘Aha Nu‘ukia is held once per year and addresses curriculum, pedagogy and assessment in addition to reinforcing the Pūnana Leo philosophy. In between these large gatherings, all teaching staff and center directors will participate in monthly

meetings via teleconference called Lā Ho‘onui‘ike focusing on language refinement and pedagogy. And lastly, all staff tasked with assessment will participate in quarterly meetings called Hālāwai Loiloi. These are the embedded mechanisms by which new concepts, curricula, teaching strategies, and assessment tool refinement and implementation will be covered.

Finally, all staff will have access to Early Childhood Education courses offered through project partner, KHUOK. These courses were developed with previous NHEP funding and have resulted in significant increases in levels of competence and confidence among teachers, and overall education attainment of the organization. Teachers and school leaders who enroll in college-level courses will receive tuition waivers, release time through a substitute, travel vouchers, childcare vouchers if needed and finally, counseling support for all phases of the process from enrollment and course selection through graduation, addressing CPP2. The lead for this activity is ██████████ the Director of Aukukui (Professional Development). Activities will begin in Year 1, concurrent with curriculum development, and span the life of the project.

## **Activity 2. Family Engagement**

Pūnana Leo’s Family Education and Engagement Program is one of the project’s strengths and will contribute to the project goal and objectives. Currently, all Pūnana Leo sites participate in the *Hui Kīpaepae*, the academic component of the family program. Weekly Hawaiian language classes are held either at the school site or online for parents and other family members. Online classes and materials are housed in Niuolahiki. All parents receive log-in information when they register their children. Families sign-on and complete assignments that are aligned with lessons that children are working on at school, empowering caregivers in their role as primary educators of their children while simultaneously advancing their own progress in learning the Hawaiian language. Access to Niuolahiki also allows ‘APL to measure rates of engagement, defined as the percentage of parents who attend classes or access online lessons or materials. Current

engagement rates are between 75-80% across all sites. The project will strive to hit this same level with new math materials (as shown in the performance measures). Until now, there has been very little explicit focus on mathematics in the classroom or at home. In order to increase math ability and literacy in Hawaiian language in the classroom and to engage family via online delivery, the project proposes to digitize, refine and electronically publish three (3) classic books, three (3) matching card sets, and three (3) new easy reader books, all related to numbers, counting and/or sequence. All materials will also be published in print format, using family input. Two computer science interns will be hired to work on graphic design and programming aspects of this activity, partially addressing CCP1. The lead for this activity is [REDACTED] who was responsible for the digital literacy materials developed in previous projects. This project translated illustrations into assets for the “Hakalama App” for both iOS and Android platforms. He will oversee the work of the interns.

### **Activity 3. Leadership Training Program**

Recommendations from WINHEC to strengthen leadership within the organization led the Director of Kula Kamali‘i (Statewide Director of Preschools) to propose an intensive leadership program. This program will focus on the skills necessary for center directors to effectively support everything from making curricular changes needed to implement the new math curriculum to conducting continuous and embedded professional development for their staff as they learn new strategies for successfully teaching math to preschoolers and assessing students’ progress in math skills. This program will also provide center directors with training in how to maintain high levels of family and community engagement, and to disseminate the philosophy of new math curriculum and educational practices that parents can adopt at home.

To develop the leadership training program, the ‘APL is adapting the innovative, leadership framework of Te Whāriki, which includes training related to five constructs:

understanding what parents care about, developing reciprocal relationships with parents and community, using a learner centered approach, ensuring successful preschool-kindergarten transition, and supporting thoughtful leadership within each site. The ‘APL will utilize a learner centered approach, encouraging school leaders to develop their own benchmarks and adapt the Te Whāriki leadership framework to their vision. The following vehicles will be used to deliver the leadership training curriculum:

Kahu will meet on a monthly basis in person or via the ‘APL’s distance learning platform, creating a professional learning community (PLC). Kahu will complete “homework” in the form of self reflection tools adapted from the Te Whāriki model. These tools create an opportunity for leaders to explore their perceptions of important leadership skills and reflect on their current abilities and areas of growth. They will bring these completed tools to meetings to discuss with the PLC. Several videos highlighting successful indigenous school leaders will also be shown allowing kahu to reflect on the content and draw comparisons between their own abilities and those of successful leaders. Through peer mentoring, more experienced center directors will be paired with one or more newer center directors to provide mentoring. The pairs will visit each others sites and shadow the more experienced center director. A rubric will be used to assess the five constructs of leadership discussed above. Site visits will occur four times per year. All center directors will attend one US mainland conference per year. The conferences will be hosted by indigenous early childhood education organizations. The goal is to exchange information and learn best practices. The culmination of their leadership training will be participation in the WINHEC accreditation process slated for 2022-2023. Each center director will take the lead or be a member of a team for a chapter of the self-study, the main deliverable of the accreditation process. The lead for this activity will be Pualani Kaho‘ohanohano, Director of Director of Kula Kamali‘i. The activity will begin in Year 1 with formative adjustments made for Year 2 and 3.

**(ii) Extent to which the proposed project demonstrates a rationale**

The project’s theory of change is based on the research on learning acquisition at the preschool and the levers that most impact that. The overall goals, objectives and anticipated outcomes are reflected in the project model and demonstrate the link between them.

**Figure 1. Logic Model: Project ‘Ōliko A Lau Ka ‘Ike**

Resources	Activities	Outputs	Outcomes		Impacts
		Process Data	Short-term	Mid-term	Long-term
		Products and Services Delivered	By the close of YR1	By the close of YR3	Post-project
<ul style="list-style-type: none"> <li>• Solid expertise in the delivery of high quality, values-based preschool education</li> <li>• Highly successful research-based literacy curriculum with proven effectiveness in supporting reading in Hawaiian language</li> <li>• Project design based on research-based approaches with evidence of moderate effectiveness (What Works Clearinghouse)</li> <li>• Long-time experience among key personnel and university partners in the development and delivery of embedded professional development that addresses language, pedagogy and assessment</li> <li>• Involvement of staff and outside researchers with expertise in math curriculum development, implementation and assessment—aligned with Pūnana Leo philosophy</li> <li>• Partnerships with University early childhood programs and support from the accrediting body WINHEC</li> <li>• Proven expertise in family engagement through online and print resources and apps to support learning in the home.</li> </ul>	<p><b>Math Curriculum Development</b></p> <ul style="list-style-type: none"> <li>• Create and pilot math curriculum for <u>preschoolers</u> modeled on highly successful literacy curriculum and research-based strategies</li> <li>• Develop and pilot assessment tools for <u>preschoolers</u></li> <li>• Introduce and reinforce pedagogy of mathematics and integration with culture, language, and literacy for <u>all instructional staff</u></li> <li>• Train in assessment and formative adjustment through ongoing observations of children for <u>all instructional staff</u></li> </ul> <p><b>Family Engagement</b></p> <ul style="list-style-type: none"> <li>• Develop online resources (e-books, animated books) for <u>parents</u> to support mathematics instruction at home</li> <li>• Develop booklets for <u>parents and students</u> for use in the classroom and home to support classroom instruction</li> <li>• Provide informal training and support for <u>parents</u> in use of new tools</li> <li>• Assess family engagement</li> </ul> <p><b>Leadership Training</b></p> <ul style="list-style-type: none"> <li>• Provide intensive leadership training for <u>center directors</u> to support curricular changes, continuous professional development of staff and family/community engagement</li> </ul>	<ul style="list-style-type: none"> <li>• <u>Math curriculum</u> developed</li> <li>• <u>Assessment tool</u> in place</li> <li>• <u>10 new online and print products</u> developed related to numbers, counting and/or sequence</li> <li>• At least <u>12 sites</u> implement curriculum and conduct assessment</li> <li>• At least <u>350 students</u> participate in project</li> <li>• <u>All participants ages 4-5</u> will be tested 2 times per year in mathematics and Hawaiian language reading ability</li> <li>• <u>2 interns</u> hired</li> <li>• At least <u>250 families</u> participate in project</li> <li>• At least <u>50 teachers</u> will complete 2-day intensive training two times per year</li> <li>• At least <u>130 staff</u> will complete intensive 3-day training each year</li> <li>• At least <u>12 center directors</u> will complete 4 peer mentoring training sessions per year</li> <li>• At least <u>12 center directors</u> will attend one leadership training conference per year</li> <li>• At least <u>4 center directors</u> will complete an Early Childhood Education (ECE) certificate with feedback and observations specific to leadership ability</li> <li>• At least <u>12 center directors</u> will contribute actively to WINHEC accreditation process.</li> </ul>	<ul style="list-style-type: none"> <li>• Students will improve in math ability <u>at least 5 percentage points</u> from baseline</li> <li>• Students will improve in Hawaiian language reading ability <u>at least 5 percentage points</u> from baseline</li> <li>• <u>65% of students</u> entering kindergarten will consistently demonstrate school readiness in literacy</li> <li>• <u>50% of teachers</u> will report they felt more confident and well-prepared in terms of math instruction and assessment.</li> <li>• <u>50% of center directors</u> will report an increase in confidence in their leadership ability.</li> <li>• <u>65% of center directors</u> will be rated as effective.</li> </ul>	<ul style="list-style-type: none"> <li>• Students will improve in math ability <u>at least 15 percentage points</u> from baseline.</li> <li>• Students will improve in Hawaiian language reading ability <u>at least 15 percentage points</u> from baseline.</li> <li>• <u>75% of students</u> entering kindergarten will consistently demonstrate school readiness in literacy and math.</li> <li>• <u>75% of teachers</u> will report an increase in confidence in terms of math instruction and assessment.</li> <li>• <u>75% of families</u> will report accessing online and print resources.</li> <li>• <u>75% of center directors</u> will report increased confidence in leadership ability.</li> <li>• <u>90% of center directors</u> will be rated as effective.</li> </ul>	<ul style="list-style-type: none"> <li>• Increased rates of <b>school readiness in math</b> among Native Hawaiian children entering kindergarten</li> <li>• Increased rates of <b>school readiness in literacy</b> among Native Hawaiian children entering kindergarten</li> <li>• Increased <b>family engagement</b> among Pūnana Leo families</li> <li>• Increased <b>leadership capacity</b> of Pūnana Leo center directors</li> <li>• ‘Aha Pūnana Leo <b>contributes to other indigenous language medium programs</b> a math curriculum, professional development approach and supporting online and print products</li> </ul>

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All proposed activities are based on needs identified in Section A and supported by the following research-backed assumptions:

An effective mathematics curriculum begins with the premise that all children are powerful mathematics learners irrespective of age and ability. However, it is not enough to simply allow children to explore math concepts on their own without structure and support: data from randomized control trials (RCT), the highest standard of evidence, find that semi-structured discovery learning with explicit instruction about math concepts results in greater learning for preschool children than children exploring concepts on their own (Baroody et al., 2009). IES and WWC have identified a number of specific strategies that educators can use to support early math learning and effectively blend discovery learning with explicit instruction. In order to successfully implement these strategies, preschool educators need formal curricula. In fact, studies show that when early educational settings formally incorporate math into the daily curriculum, children demonstrate greater kindergarten readiness in both math and reading (Arnold, et al., 2002; Clements & Sarama, 2007). This evidence has led the NAEYC/NCTM to recommend that all preschools implement math curricula using evidence-based sequencing of mathematical ideas (Frye et al., 2013).

One of the key recommendations made by the WWC panel on early math learning is to encourage children to describe their world mathematically (Frye et al., 2013). For this reason, it is not sufficient to merely apply an English and/or mainland-based curriculum to the Hawaiian medium education setting. It is when children have numerous opportunities to see *themselves* as powerful and competent mathematical learners that the curriculum can justly be called effective. Thus, to successfully serve the preschoolers in the ‘APL, as well as other Native Hawaiian children in Hawai‘i, it is necessary to develop a new curriculum that is based on the Hawaiian worldview

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(Iokepa-Guerrero, 2010). Early educational settings play a crucial role in the development of young children’s mathematical proficiency because it is the time when attitudes towards mathematics are formed. Researchers who created the Te Whāriki early childhood curriculum believed that positive attitudes are more likely when children’s mathematical learning begins as informal and intuitive learning, influenced by the child’s culture and experiences they are growing up in.

The recommendation to teach children to describe their world mathematically also encompasses the key link between language and math ability. This recommendation is based on evidence from RCTs and quasi-experimental studies (QES) which shows that teaching children to use and understand math vocabulary in context supports children’s ability to learn math concepts (NAEYC & NCTM, 2010). The WWC panel believes “there is evidence of a positive relationship between math-related talk and children’s math knowledge.” In fact, the language that children use in talking about math not only supports the acquisition of math concepts, but also promotes children’s vocabulary skills. Math concepts can be supported through book reading, which naturally benefits reading ability, and teaching children to explain their process for thinking about and solving math problems supports key literacy skills (Scholastic, 2020).

Including parents in children’s educational experiences also strengthens children’s educational outcomes. Froiland et al. (2013) found that parental involvement in early education has a long-term, positive effect on students’ achievement outcomes lasting into 8<sup>th</sup> grade, setting the stage for post-graduation success. Moreover, Cybele-Raver et al. (2007) argue that the school readiness gap among ethnic minorities can be decreased through engaging families and providing them with educational resources. These studies highlight a need to implement a developmentally appropriate curriculum, and to involve parents in children’s early exposure to math by providing them with resources and the skills to teach at home. Given the extent to which ‘APL already

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engages families in the Hawaiian literacy and language programs, the current grant proposes to build off of those existing programs and expand them into the domain of math.

Research strongly supports the need for the development of a new math curriculum in combination with family engagement to support increases in preschoolers’ math ability, kindergarten readiness, and later academic success. However, none of these activities will be successful without system-wide support from the top. For this reason, ‘APL proposes to develop and implement professional development programs for leadership and staff. This proposal is supported by data from the *Evidence-based Program for Integrated Curricula (EPIC)*, a stand-alone preschool curriculum developed for Head Start children that incorporates a clearly sequenced, developmentally appropriate curriculum in combination with professional development. The professional development followed a distributed leadership model, similar to the one proposed by ‘APL whereby professional development is implemented within classrooms, across different classrooms, and across levels of the organization for maximum success (Spillane, 2006). Using this model, the Head Start children who participated in the program showed greater gains in mathematics skills, literacy skills, and preschool readiness than similar peers in another preschool enrichment program that did not have a focus on professional development at every level of the organization (Fantuzzo et al., 2010, Frye et al., 2013). Taken together, the evidence supports the proposal to implement professional development for teachers and leadership in order to successfully roll-out a new math curriculum and engage families. By building off of successful comprehensive and integrated programs like *Te Whāriki* and *EPIC*, ‘APL will be able to successfully roll out a culturally relevant and developmentally appropriate math curriculum with the support of teachers and parents, all of which are shown to maximize student learning and success.

## **C. QUALITY OF PROJECT SERVICES**

### ***(i) The quality and sufficiency of strategies for ensuring equal access***

The ‘APL will adhere to the following, targeted strategies for participants to ensure equitable access and treatment to services:

For all open and contractual positions, the ‘APL will encourage applications from individuals represent the demographics of the target participants and who are culturally competent and aware of the challenges faced by Native Hawaiians and specifically Native Hawaiian parents and educators. In this way, the project roll-out is done in a manner that is *pono* (in harmony, respectful and righteous).

The ‘APL relies on a culture of professional learning communities where knowledge is shared. Cultural sensitivity will be built into every stage of project implementation as it is embedded in the development of the new curriculum and professional development opportunities, and key to engaging families and their children. The evaluation is will be built upon an indigenous framework developed by a consortium of Native Hawaiian and Māori evaluators and is supported by the American Evaluation Association and the W.K. Kellogg Foundation (Kawakami, et. al, 2008). This evaluation approach requires the evaluator to “step into the group being evaluated, learning about their life situations, experiences and their relationship with the environment” (NHEC, 2018).

Pūnana Leo parents and extended families who may be low-income, disabled, unemployed or even living in rural or remote locations will be encouraged to participate in all activities, and support will be provided as needed. For example, Niuolohiki online modules will be made available at each site through their Life Size online platform, in the event the family does not have internet access. In addition, Pūnana Leo teachers and school leaders who are low-income or located in rural

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and remote areas will be provided with transportation vouchers and a substitute teacher for the time when they need to attend professional development activities.

***(ii) Services reflect up-to-date knowledge from research and effective practice***

As discussed in the Project Design, section ii, all proposed services are grounded in the following evidence-based practices based on research from the past 20 years:

- Semi-structured discovery learning with explicit instruction about math concepts results in greater learning for preschool children (Baroody et al., 2009).
- When early educational settings incorporate math into the daily curriculum, children demonstrate greater kindergarten readiness in both math and reading (Arnold, et al., 2002; Clements & Sarama, 2007; Frye et al., 2013).
- To effectively serve Native Hawaiian preschoolers, the curriculum should be based on the Hawaiian worldview (Iokepa-Guerrero, 2010).
- The language that children use in talking about math not only supports the acquisition of math concepts, but also benefits children’s vocabulary skills (NAEYC & NCTM, 2010, Scholastic, 2020).
- Including parents in children’s educational experiences also strengthens children’s educational outcomes (Froiland et al., 2013). Moreover, the school readiness gap among ethnic minorities can be decreased through engaging families and providing them with educational resources (Cybele-Raver et al., 2007).
- Professional development must be implemented within classrooms, across different classrooms, and across levels of the organization for maximum success (Spillane, 2006).

**D. QUALITY OF PROJECT PERSONNEL**

***(i) Applicant encourages applications from traditionally underrepresented persons***

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All key project personnel have been identified, based on their recent and relevant experience. While no new positions are proposed, in the event new hiring is required, the project will make an intentional effort to recruit and encourage employment applications from members of traditionally underrepresented groups. Applicants will be recruited from a variety of locations, consistent with ‘APL’s recruitment and hiring practices. Due to the need for applicants with proficiency or fluency in Hawaiian language, we will recruit from locations such as UHH’s Kahuawaiola (immersion teacher education) program, HODOE Kaiapuni (K-12 immersion education) program, Hawaiian language medium television and radio programs, community organizations that serve Native Hawaiian residents—all of which will contribute to a pool of applicants that have been traditionally underrepresented based on race, color, national origin, gender, age, or disability. The demographics of these programs show that nearly 90% of students are of Native Hawaiian ancestry, a population that has been traditionally underrepresented in professional jobs, especially education, and overrepresented in service industry and construction jobs. Due to the fact that the majority of employees in HME are female, a special effort will be made to recruit *kāne* (male) employees, who are both proficient in Hawaiian and bring relevant training and experience to the job, as discussed above. And finally, efforts will be made to encourage applicants with disabilities to apply such as officially requesting assistance from state and community agencies with expertise in serving persons with special needs.

***(ii) The qualifications, including relevant training and experience, of key project personnel.***

**██████████ Project Investigator (.05 FTE—not grant funded)**, is a fluent bilingual speaker of Hawaiian and English and is the President of the Board of Directors and a founding parent of the ‘APL. She is currently an associate professor at KHUOK at the UHH and is the Director of the College’s laboratory schools. She holds a doctorate in Indigenous and Hawaiian

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Language and Culture Revitalization and a Master’s in Linguistics. As PI, she adds an additional layer of accountability by providing financial and technical oversight of the evaluation and advising the team as needed.

██████████ **Project Director (1.0 FTE)** is a fluent bilingual speaker of Hawaiian and English and holds a BA in Hawaiian Studies with an emphasis in Cultural Anthropology. She has over 20 years of experience in Hawaiian medium education starting as a parent and office support staff and now heads up the statewide systems operation of the ‘APL. She has previously directed NHEP federal grants in 2014 and again in 2017—both of which successfully achieved all objectives and deliverables, on time and within budget. ██████████

██████████ will oversee the project, making day-to-day decisions about scheduling and purchases. In addition, she will oversee the professional development portion specific to center directors, who fall under her direct supervision. She will also be the direct liaison for contracts in evaluation and training and ensure the project staff follows the implementation and management timeline from start to finish and within budget.

██████████, **Professional Development Director (.50 FTE)** holds a BA in Hawaiian Language and Culture. She is a fluent bilingual speaker of Hawaiian and English and has been with the ‘APL and Hawaiian medium education for over 25 years. ██████████ will serve as the lead for the professional development, specific to teachers. She will be supported by her highly competent Aukukui team and project partners at KHUOK. For college course enrollment, she will serve as the counselor between the Pūnana Leo staff and KHUOK. She will collect college transcripts each semester in order to track participants enrolling in post-secondary education.

██████████ **Professional Development Specialist (.50 FTE)**, is a fluent bilingual speaker of Hawaiian and English and has taught at the Pūnana Leo preschools in all teaching levels

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since 2007. She earned a Master’s degree in Indigenous Language and Culture Education and holds a certificate in Early Childhood Education in Hawaiian Medium and a post-baccalaureate teaching certificate in Indigenous Education. [REDACTED] will contribute to the development of the math curriculum and provide professional development and assessment specific to the math program.

[REDACTED], **Niuolahiki Distance Learning Manager (.50 FTE)**, is a fluent bilingual speaker of Hawaiian and English with significant knowledge of software applications including QuarkXPress, Adobe InDesign, Adobe Captivate, Moodle, WordPress and Adobe Photoshop. He has been the ‘APL graphic designer for over 10 years, a distance learning manager for 10 years and a family engagement team member for 7 years, totaling 20 years with the organization. He holds bachelor’s degrees in Graphic Design and Hawaiian Language. He will maintain the Niuolahiki online content server that will house newly developed classroom and family support materials. He will also contribute to and oversee the work of interns that will develop digital and print books for math based on similar work done for literacy.

#### **E. QUALITY OF THE MANAGEMENT PLAN**

***(i) The adequacy of the management plan to achieve the objectives of the proposed project on time and within budget***

The Project Director will be responsible for day-to-day operation of the project. The Management Plan (Table 2) and Evaluation Plan (Table 3) provide ample detail regarding project implementation, management and reporting and will be used as management tools.

The management plan below details specific tasks, a timeline, and quarterly milestones or deliverables. While only key personnel are listed, they are supported by several individuals who facilitate project timelines and milestones. They are: Clerical Support (1.0 FTE), the Human Resources Manager (.10 FTE) and the Fiscal Officer (.10 FTE). accountability, reinforcing the plan to complete the project on time and within budget.

<b>TABLE 2. MANAGEMENT PLAN</b>			
<b>Q1</b> = September 1 – November 30 <b>Q2</b> = December 1 – February 28 <b>Q3</b> = March 1 – May 31 <b>Q4</b> = June 1 – August 30		<b>PD</b> = Project Director, <b>PDD</b> = Professional Development Director; <b>PDS</b> = Professional Development Specialist; <b>OLM</b> = Online Learning Manager	
<b><i>Activity 1. Math Program Development</i></b>			
<b>Key Steps</b>	<b>Personnel</b>	<b>Timeframe</b>	<b>Milestones &amp; Deliverables</b>
Execute contract with KHUOK for linguistics consulting on math curriculum.	PD	09/20 – 12/20	YR1Q1 – KHUOK contract executed
Initiate curriculum development, seeking input from teachers during PD gatherings.	PDS	09/20 – 05/21	YR1Q3 – Framework of curriculum complete
Initiate development of assessment tool, aligned with curriculum.	PDS	09/20 – 05/21	YR1Q3 – Draft of assessment tool, ready for validity and reliability testing
Conduct annual assessments	PDS		YR1/2/3Q4 – All participants ages 4-5 are being tested 2 times per year in mathematics and Hawaiian language reading ability.
Finalize curriculum and test assessment tool.	PDS	05/21 – 08/21	YR1Q4 – Final iteration of curriculum, supporting activities, and assessment tool
Introduce to instructional staff at Fall, Spring and Summer PD sessions. Conduct role-play and discuss activities.	PDD PDS	09/21 – 05/22 09/22 – 05/23	YR2/3Q4 – At least 50 teachers complete 2-day intensive training two times per year. At least 130 staff complete intensive 3-day training each year
Make adjustments to both curriculum and tool as needed, based on staff feedback, observation-loop and assessments of students.	PDS	05/22 – 08/22	YR2Q4 – Pilot complete
Roll out final curriculum and assessment tool.	PDS	09/22 – 12/22	YR3Q4 – At least 12 sites are implementing curriculum and conducting assessment. At least 350 students are receiving curriculum.
<b><i>Activity 2. Family Engagement</i></b>			
<b>Key Steps</b>	<b>Personnel</b>	<b>Timeframe</b>	<b>Milestones &amp; Deliverables</b>

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Recruit and hire computer science interns for programming and graphic design.	OLM	09/20 – 12/20	YR1Q1 – Interns hired and trained
Gather assets and prepare selected titles for production including recorded audio/narration if needed.	OLM	09/20 – 02/21	YR1Q2 – Assets gathered; titles identified
Design, layout and electronically produce selected titles.	OLM	03/21 – 08/21	YR1Q4 – Three (3) digitized refined and electronically published classic books. At least 250 families participate in project.
Assess parent engagement.			YR1/2/3Q4 – At least 250 families participate in project.
Gather assets and prepare selected matching card sets for production.	OLM	09/21 – 02/22	YR2Q2 – Assets gathered and prepared for production
Design, layout and electronically produce selected matching card sets.	OLM	03/22 – 08/22	YR2Q4 – Three (3) digitized refined and electronically published classic matching card sets.
Gather assets and prepare newly created easy reader books for production including recorded audio/narration.	OLM	09/22 – 02/23	YR3Q2 – Assets gathered and prepared for production
Design, layout and electronically produce easy readers and interactive game.	OLM	03/18 – 08/23	YR3Q4 – 3 new easy reader books and one (1) re-created and electronically published classic ‘APL interactive counting game.
<b><i>Activity 3. Leadership Training Program</i></b>			
<b>Key Steps</b>	<b>Personnel</b>	<b>Timeframe</b>	<b>Milestones &amp; Deliverables</b>
Using peer mentorship model for center directors, facilitate site visits/exchanges.	PD	09/20 – 08/21	YR1/2/3Q4 – At least 12 center directors will complete 4 peer mentoring trainings per year.
Assist participants to enroll in HME ECE certificate and degree pathway, tracking progress and completion rates.	PDD	09/20 – 08/21 09/21 – 08/22 09/22 – 08/23	YR3Q4 – At least 4 center directors will complete an Early Childhood Education (ECE) certificate or degree.
Conduct research and solicit feedback from school leaders on relevant conferences.	PD	09/20 – 08/21 09/21 – 08/22 09/22 – 08/23	YR1/2/3Q4 – At least 12 center directors will attend a leadership training conference, annually.

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Begin planning for self-study including assignment of roles and creation of teams utilizing the peer mentor model.	PD	09/22 – 12/22	YR1/2/3Q4 – At least 12 center directors will contribute actively to WINHEC accreditation process.
<i><b>Project Management, Reporting and Compliance</b></i>			
<b>Key Steps</b>	<b>Personnel</b>	<b>Timeframe</b>	<b>Milestones &amp; Deliverables</b>
Convene bi-monthly meetings team meetings to report on progress, identify barriers, address challenges and track budget expenditures.	PD	09/20 – 08/21 09/21 – 08/22 09/22 – 08/23	YR1/2/3Q4 – At least 4 meetings will be held each year.
Complete ED-required travel.	PD SDC	09/20 – 08/21 09/21 – 08/22 09/22 – 08/23	YR1/2/3Q4 – All ED-required travel will be completed.
Complete quarterly and annual/final reports.	PD	09/20 – 08/21 09/21 – 08/22 09/22 – 08/23	YR1/2/3Q4 – Annual project and fiscal reports will be submitted on time and accepted as complete.

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Quarterly meetings will provide an opportunity for activity directors to report on progress, challenges, proposed solutions and new opportunities. Clerical staff will take minutes to document progress and follow-up steps. Qualitative information and process data (milestones/deliverables and participation rates) from these meetings will also contribute to the process evaluation conducted by the Evaluator.

***(ii) Mechanisms for ensuring high-quality products and services***

There are a number of products that will be generated: a Hawaiian culture-based math curriculum, a tool that assesses math ability among 4 and 5-year old preschoolers, and online digital resources for families. Individuals selected for the development of these products have significant experience and expertise in their respective areas coupled with a high level of Hawaiian language fluency. Moreover, the team approach adds multiple perspective and skills while increasing accountability. Additionally, the Aukukui department (responsible professional development) along with KHUOK linguistic experts will vet all products that are created during the project to ensure the highest quality. They will also oversee much of the professional development.

Services provided through this project will also adhere to the highest quality. The ‘APL has long been responsible for the development of all services, relying on the linguistic and cultural expertise of its founders—as laid out in the Kumu Honua Maui Ola, the Native Hawaiian Educational Philosophy that guides all service delivery and ensures cultural fidelity. As such, these individuals will oversee the delivery of much of the content for target audiences. It is this commitment to excellence that has prompted the ‘APL to further develop their leadership, such that when the founders retire, the high level of quality maintained by the founders will be perpetuated. Services pertaining to leadership development activities are primarily learner-driven, a successful approach to organizational management. This entails school leaders developing standards of

excellence by which they will be held accountable and use of a peer mentoring to model high quality leadership. According to the Harvard School of Business, both approaches have proven effectiveness with respect to quality and efficiency (DesMet & Gao, 2018) Leaders who create benchmarks through professional learning communities are more likely to adhere to or surpass these standards than those imposed upon them from management.

## **F. QUALITY OF PROJECT EVALUATION**

### ***(i) The extent the methods of the evaluation will provide valid and reliable performance data on relevant outcomes.***

The goal of the evaluation is to produce credible, timely, and actionable information to support successful project implementation and inform project staff and stakeholders of the outcomes and impact of the program. The evaluation will have two elements—a process study and an outcomes study.

The process study will use qualitative data (from meetings, focus groups with families and document review) and quantitative data (from staff surveys, student assessments, and family participation data) to provide a rich understanding of implementation findings. Findings will be triangulated across data sources to describe implementation. The evaluation team will use a variety of descriptive statistics to describe program implementation. Qualitative data will thematically coded to uncover trends across sites. Family participation data and survey data will be analyzed to explore patterns of implementation, over time.

The outcomes study will rely on quantitative data to describe student outcomes and understand relationships between project activities and student outcomes. To examine outcome changes for preschoolers ages 4-5, we will conduct a series of comparative statistical analyses, mainly within-group longitudinal analyses tracking outcomes over time. The evaluation will also examine the relationship between family participation rates participation and academic outcomes.

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The project evaluator will provide annual implementation reports on project progress—assessing progress on the key steps and milestones identified in the project management plan. This level of formative data serves as an evaluation feedback loop and is intended for adjustments and improvements to project implementation. In Year 3, a summative evaluation report will analyze overall project implementation by assessing which strategies were most successful and which require modification or elimination as well as demonstrating the extent to which the project met its goals.

The evaluation plan incorporates an indigenous framework for evaluation developed by a consortium of Native Hawaiian and Māori evaluators and is supported by the American Evaluation Association. Among the aspects of the framework that differ from mainstream evaluation approaches are (a) the emphasis on storytelling by participants and key stakeholders, (b) participant input into major aspects of the evaluation, and that (c) cultural significance can be more important than statistical or practical significance. As such, this evaluation uses a research design that regards participant feedback as primary evaluation data and ensures cultural appropriateness at all phases of the evaluation, promoting and practicing an indigenous worldview.

<b>TABLE 3. OVERVIEW OF EVALUATION PLAN</b>		
<b>Activity 1. Math Program Development</b>		
<b>Performance Measures and Outcomes</b>	<b>Source of Data/Methods</b>	<b>Data Analysis</b>
1.1 On average, students’ math scores will increase by at least 15 percentage points.	CBM-Makemakika (pre-post)	Descriptive analysis of longitudinal change over time using logistic regression or chi-square statistics  Qualitative summary, coding of responses and descriptive statistics for participants
1.2 On average, students’ Hawaiian reading scores will improve by at least 15 percentage points (GPRA Measure 4)	CBM-Heluhelu (pre-post)	
1.3 75% of students entering kindergarten will demonstrate readiness in literacy and math	HKPLA (pre-post) Survey (pre-post), focus groups	

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(GPRA Measure 2) 1.4 75% of teachers will report increased confidence in math instruction and assessment.		
<b>Activity 2. Family Engagement</b>		
<b>Performance Measures and Outcomes</b>	<b>Source of Data/Methods</b>	<b>Data Analysis</b>
2.1.75% of families will report accessing online and print resources for mathematics instruction at home.	Focus Groups Family Survey (post only) Family Participation Rates	Qualitative summary, coding of responses and descriptive statistics for participants and calculations of participation rates
<b>Activity 3. Leadership Training</b>		
<b>Performance Measures and Outcomes</b>	<b>Source Data/Methods</b>	<b>Data Analysis</b>
3.1 75% of center directors will report increased confidence in their leadership ability. 3.2 90% of center directors will be rated as effective.	Self-reflection tool (pre-post) Observation rubric	Qualitative summary, coding of responses and descriptive statistics for participants

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