

Teacher Quality Program
University of New Hampshire
Teacher Residency for Rural Education (UNH-TRRE)

TABLE OF CONTENTS

Competitive Preference Priority 2.....	1
A. Significance.....	2
B. Quality of the Project Design.....	10
C. Quality of the Management Plan.....	32
D. Quality of the Project Evaluation.....	42

University of New Hampshire-Teacher Residency for Rural Education (UNH-TRRE)

The University of New Hampshire (UNH) is pleased to submit this proposal to the U.S. Office of Innovation and Improvement Teacher Quality Partnership Grants Program in response to Absolute Priority 2 - Partnership Grants for the Establishment of Effective Teaching Residency Programs; Competitive Preference Priority - Supporting High-Need Students served by rural LEAs; and Invitational Priority - Enhancing Cultural Competencies to Support High-Need Students. To meet these priorities, the UNH-Teacher Residency for Rural Education (UNH-TRRE) will offer pathways leading to a master's degree and either elementary certification with middle school science (K-8), elementary certification with middle school mathematics (K-8), secondary science certification (7-12), or secondary mathematics certification (7-12), with an option to pursue additional certification in special education.

UNH-TRRE involves collaboration among key partners at multiple levels including UNH, the NH Department of Education (NHDOE), North Country Education Services (NCES), a consortium of rural high-need LEAs and schools, and community-based partners committed to supporting the development of high quality teachers for high-need rural students in New Hampshire. UNH-TRRE goals include:

Goal 1: UNH-TRRE will recruit and prepare 60 highly qualified math and science teachers with skills matched to the needs of students in the high-need partner LEAs.

Goal 2: UNH-TRRE graduates will be hired and retained as teachers in high-need partner LEAs.

Goal 3: Students of UNH-TRRE graduates will outperform students of non-participating novice math and science teachers in rural NH.

Goal 4: UNH, NHDOE, rural high-need partner LEAs and schools will develop and sustain project partnerships and institutionalize its reforms.

To meet these goals, UNH-TRRE will rest on three instructional pillars designed to set

the foundation for pedagogical, clinical, and community-based knowledge and skills for teaching that respond to the assets and needs of rural NH communities. These pillars are:

1. *Content & pedagogy* that are integrated with intensive clinical placements in schools, where residents: (1a) Acquire strong content and pedagogical knowledge to meet rigorous academic standards; (1b) Use data to inform instruction; (1c) Apply concepts of Universal Design for Learning (UDL).

2. *Clinical strength*, where residents participate in experiences that build their social capital in and local knowledge of community contexts. Residents will: (2a) Engage in an initial field placement; (2b) Develop knowledge and skills to teach in rural schools through a full year residency; (2c) Participate in an induction program for two years following residency.

3. *Community and family competence* in rural teaching, providing a core curricular emphasis on residents learning to leverage rural family and community “funds of knowledge” to support student engagement and achievement. Residents will: (3a) Build on the assets of the rural communities through an out-of-school placement with a community-based agency or organization; (3b) Address the interests and commitments of the rural communities; (3c) Integrate in- and out-of-school resources and learning opportunities.

A. SIGNIFICANCE

(i) The extent to which the proposed project is likely to build capacity to provide, improve, or expand services that address the needs of the target population.

In 2014-2015, NH statewide performance data indicated that 46% students met or exceeded standards in mathematics (based on Smarter Balanced assessment results) and 36% of students were proficient or above in science (based on New England Common Assessment Program results). These results reflect concerns that “New Hampshire’s K-12 math achievement

is not strong enough for young people to excel in the growing science, technology, engineering and math (STEM) field” (New Hampshire Department of Education, 2014).

In light of this, the Governor’s Task Force on STEM Education was developed as one of multiple efforts to prioritize STEM education. In its final report, the Task Force (2015) stresses the growing challenges confronting rural school districts in efforts to modernize STEM education including low student population density, inaccessibility of professional development opportunities and fewer STEM businesses. The final report also highlights rural teacher need, indicating, “STEM teacher recruitment and retention is a problem across the state, but particularly pronounced in rural New Hampshire. Foundation and federal grants and other funding should be sought to help rural areas provide incentives to STEM educators” (p. 53).

In the establishment of UNH-TRRE, **UNH** will serve as the eligible partner IHE. UNH is New Hampshire’s flagship public institution, enrolling approximately 15,000 undergraduate and graduate students with campuses located in Durham, Manchester and Concord. As a federally recognized land-, sea-, and space-grant university, UNH has a strong organizational track record in STEM-related programs and partnerships. As a rigorously vetted *100Kin10* partner, UNH has established the STEM Teachers Collaborative, an interdisciplinary effort to strengthen the STEM pipeline and extend the impact of excellent STEM teachers to more NH students. UNH also houses the **Joan and James Leitzel Center**, which promotes research and interdisciplinary collaboration focused on P-12 education in mathematics, science, and engineering.

The **UNH Department of Education**, housed within the **College of Liberal Arts** will serve as the College or School of Education within the partner IHE. The department’s five-year and post-baccalaureate teacher education program’s graduate level, yearlong internship model was the first of its kind at a public university in the U.S. when it was developed in 1974. The

teacher education program is nationally accredited by Council for the Accreditation of Educator Preparation, and in 2015 was awarded the Frank B. Murray Award for Innovation and Excellence in Program Self-Study, which recognizes excellence in inquiry into the performance of the program's candidates and completers and in the capacity of the program's quality control system to support programmatic improvement and excellence.

UNH has a longstanding commitment to preparing and retaining teachers, and approximately 65% of teacher preparation program graduates teach in New Hampshire. Teacher preparation coursework and intensive clinical experiences are designed in collaboration with partnership schools in rural, suburban, and urban communities across the state. Recent surveys of program graduates indicate trends well above national averages: 94% teach after completing the UNH Teacher Education Program; 89% are currently teaching or are in an education field; and 84% are teaching full-time after 5 years (roughly double the national average for retention at 5+ years).

To demonstrate high academic standards at the time of admission, applicants to the teacher preparation program must possess a minimum undergraduate GPA of 3.0 (the current average undergraduate GPA of students accepted to the program is 3.52), achieve a passing score on the Praxis CORE exam, receive positive evaluations from an undergraduate 60-hour practicum and seminar in a K-12 classroom setting, submit three letters of recommendation, and complete a written statement that addresses how their experiences have informed their decision to pursue a career in teaching.

To complete the teacher preparation program and earn recommendation for state certification, students must maintain a B average (no grade lower than B-) for all graduate-level coursework and must successfully complete a full-year internship under the guidance of a

school-based cooperating teacher with evaluation by a university-based supervisor. All UNH teacher preparation program graduates recommended for certification in New Hampshire are highly qualified with a Masters degree, demonstrated subject-matter competence, and passing scores on state certification exams. Based on 2013-2014 data, graduates have a Praxis II pass rate of 92%, indicating strong content and pedagogical knowledge.

The **UNH College of Engineering and Physical Sciences** and its **Department of Mathematics and Statistics** will serve as the eligible partner in the Liberal Arts and Sciences within UNH. The department has a long history and commitment to serving NH teachers in ways that deepen their understanding of mathematics and mathematics pedagogy, as well as a strong history of research and program development funding from the NHDOE, the National Science Foundation, and the US Department of Education. Faculty teach a breadth of courses in mathematics and mathematics education at both the undergraduate and graduate levels, and recently worked with faculty in the Department of Education to establish a program leading to Elementary Mathematics Specialist Certification, the first and only such program in the state. In addition, the department houses the Master of Science for Teachers in Mathematics program.

As we describe in detail in the project design, additional UNH partners will offer institutional support to this collaboration. **UNH Cooperative Extension** (UNHCE) partners with New Hampshire communities to meet local needs by tailoring contemporary, practical education through professional development, volunteer training, and community-based youth development programs. The **UNH Joan and James Leitzel Center** works to transform education in mathematics, science, and engineering in elementary and secondary schools and in informal settings through high quality research, carefully examined practice, and interdisciplinary collaboration. The Center's **STEM Teachers Collaborative** is an interdisciplinary effort to

strengthen the STEM pipeline, increase K-12 teachers' expertise in computing, engineering and technology and extend the impact of excellent STEM teachers to more students throughout the state. It was the leading effort of UNH's **national partnership in the 100Kin10 initiative**. The **UNH Carsey School of Public Policy** provides partnership with communities and top quality research, leadership development, and engaged scholarship relevant to public policy.

Based on its longstanding commitment to prepare NH teachers, UNH has partnered with the **NH Department of Education (NHDOE)** and **North Country Education Services (NCES)**, as well as **rural high-need LEAs** and **schools** to establish an effective teacher residency (Absolute Priority 2) for high-need rural schools (Competitive Preference Priority) that supports residents in developing cultural competencies to teach in rural settings (Invitational Priority).

A consortium of four rural, high-need LEAs in northern New Hampshire has committed to partnering with UNH to support this project. In New Hampshire, LEAs are organized as School Administrative Units (SAUs) that cluster districts under the leadership of one superintendent. Each LEA serves rural communities and is either eligible for the Rural Low-Income School Program (RLIS), the Small Rural Schools Achievement Program (SRSA), or serves a population of more than 20% students in poverty (as indicated by 2014 census data). These **four rural high-need partner LEAs** include **SAUs 3, 20, 30, and 36**.

SAU #	District Name	Student enrollment 2014 - 2015	Rural, high-need LEA eligibility
3	Berlin	1221	Rural and Low-income School Program; 24% students in poverty (2014 census data)
20	Dummer	No schools currently assigned to this district	
	Errol	13	Small Rural Schools Achievement Program
	Milan	113	Does not meet federal qualifications for high-need rural districts
	Gorham Randolph Shelburne Cooperative	447	Small Rural Schools Achievement Program

30	Laconia	2065	Rural and Low-income School Program; 20% students in poverty (2014 census data)
36	White Mountains Regional	1161	Rural and Low-income School Program
Total Enrolled Students		5,020	

As the table below indicates, in 2014-2015, many districts within the SAUs had more than 5% of core classes taught by teachers who did not have appropriate qualifications or certification to meet highly qualified teacher status (Source NH Dept. of Education), demonstrating teacher need.

SAU	Districts	Percent of core classes taught by non-Highly Qualified Teachers (2014-2015 data)
3	Berlin	1.3%
20	Dummer	--
	Errol	15.9%
	Milan	0%
	Gorham Randolph Shelburne Cooperative	1%
30	Laconia	8.5%
36	White Mountains Regional	13.7%

Given the challenge of attracting teachers to the districts, teacher turnover, and impending retirements across the LEAs, the superintendents projected 150 new teacher hires over the next five years (2016-2021), highlighting significant teacher need across the LEAs (Source: UNH-TRRE LEA Partner Needs Assessment).

As indicated in the Governor’s STEM Task Force’s final report, during the 2012-2013 academic year, there were only 91 teacher prep candidates for 184 vacancies for science and math vacancies in NH (p.8). More recently, the NHDOE listed middle and high school mathematics and science on its critical shortage list for 2015-2016 (New Hampshire Department of Education, 2014). The rural high-need partner LEAs have confirmed this need, with superintendents indicating in the needs assessment (See Appendix C) that certified **elementary** and **secondary mathematics, science, and special education** teachers are in particular demand.

Student achievement data across the LEAs suggest that many of these rural, high-poverty districts perform lower than the state average in reading/ELA, math, and science, based on Smarter Balanced in ELA and mathematics and New England Common Assessment Program (NECAP) in science results.

SAU	Districts*	Reading/ELA % Meeting Standards or above (2014- 2015)	Mathematics % Meeting Standards or above (2014- 2015)	Science % Meeting Proficient or above (2014- 2015)
3	Berlin	44%	26%	20%
20	Dummer	---	---	---
	Errol	**	**	**
	Milan	65%	54%	29%
	Gorham Randolph Shelburne Cooperative	47%	40%	30%
30	Laconia	45%	31%	25%
36	White Mountains Regional	62%	52%	36%
NH STATE AVERAGE		58%	46%	36%

* Due to the small number of students in the rural high-need LEAs, student achievement data is reported at the district level ** Indicates total number of test takers in 10 or less.

Within the partner high-need LEAs, the project will focus on **8 high-need schools**. The schools fall within the high-need criteria, based on the percentage of students eligible for free- and reduced-price lunch.

SAU	School	Enrollment (2014-2015)	% Students eligible for FRPL (2014-2015)
3	Hillside School	251	66.14%
	Brown School	171	62.57%
	Berlin Middle School	294	53.74%
	Berlin Senior High School	430	49.30%
20	Errol Consolidated School*	12	25%
30	Laconia Middle School	437	55.61%
	Laconia High School	627	53.27%
36	Lancaster School	331	51.06%

* Given the unique rural characteristics of ECS and the opportunity for UNH-TRRE to have a significant impact on the local community, we would like to petition this school to be considered as a rural, high-need partner school.

Across New Hampshire, and in particular the rural high-need LEA and school partners, there is a demonstrated need for elementary and secondary mathematics and science teachers who have the knowledge and skills to meet the multiple needs of students. UNH-TRRE is designed to respond to these articulated needs.

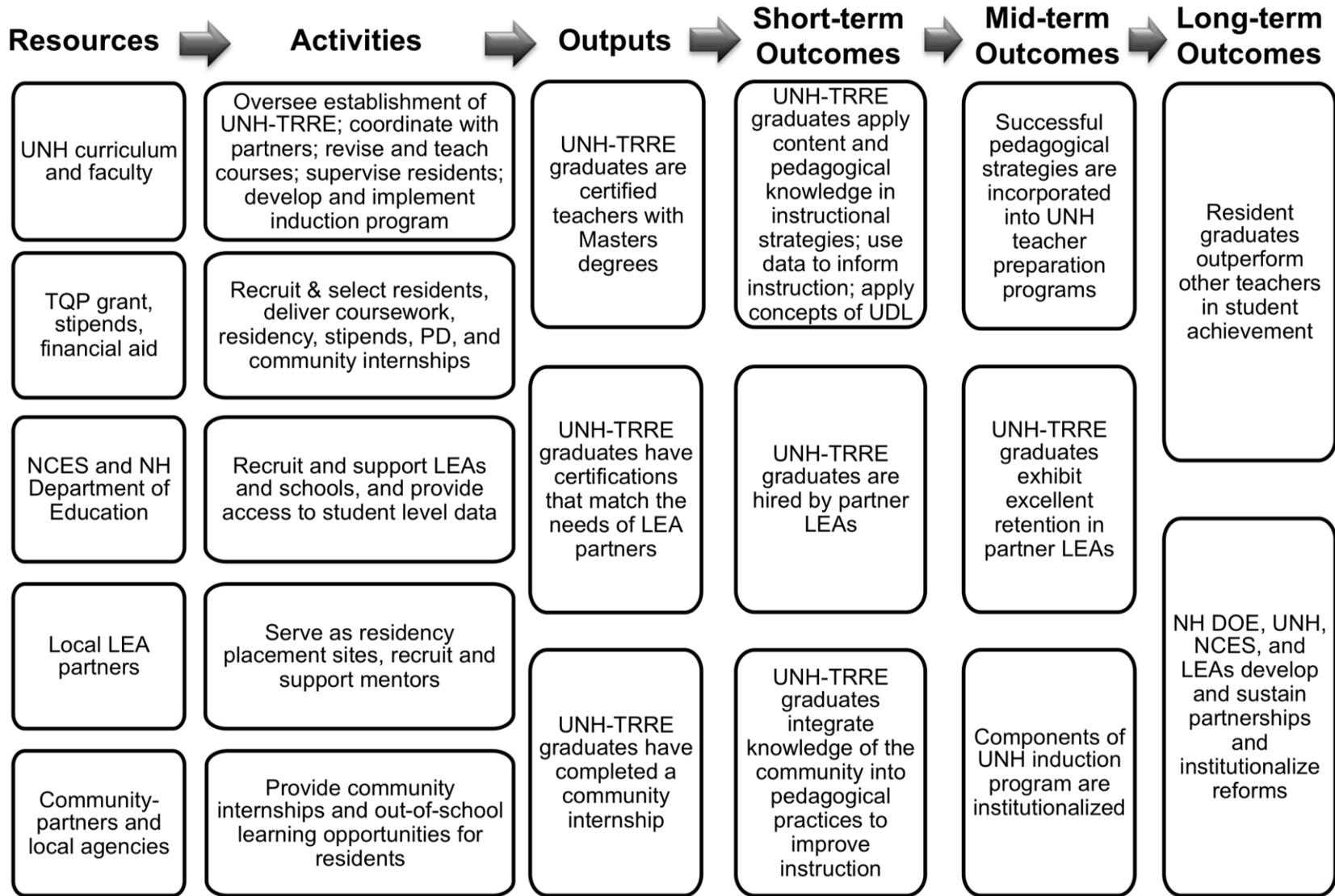
(ii) The importance or magnitude of the results or outcomes likely to be attained by the proposed project, especially improvements in teaching and student achievement.

To create sustained improvements in the quality of teaching and student achievement in science and math in rural, high-poverty schools in New Hampshire, UNH-TRRE will: 1) prepare 60 highly qualified math and science teachers in rural high-need schools over the five year grant period; 2) support the development of cultural competency for rural teaching by drawing on the assets of the rural communities; 3) build teachers' capacity to use data to inform instruction and apply concepts of UDL; 4) establish a professional network of teachers through induction support across rural high-need schools; 5) provide experienced teachers with professional development and support to serve as mentor teachers and school leaders beyond the residency program; 6) establish long-lasting partnerships among UNH and partner LEAs and schools; and 7) provide data that identify best practices in teacher preparation for rural communities. Given the breadth of LEA and school partners, UNH-TRRE has the potential to create a pipeline of highly qualified elementary and secondary mathematics and science teachers (with an option to pursue additional certification in special education) for rural high-need schools and improve student achievement.

UNH-TRRE internal and external evaluation data will provide ongoing information regarding program completion, retention, instructional practice, effective design and implementation, and student achievement. These data will inform the decisions regarding effective systems of teacher preparation for rural communities in the state and across the country.

B. QUALITY OF PROJECT DESIGN

UNH Teacher Residency for Rural Education Logic Model



Design Connected to Impact—Goal 1: UNH’s TRRE project will recruit and prepare highly qualified math and science teachers with skills matched to student needs in the partner LEAs.

- a. Using a rigorous selection process, the project will recruit 10-20 qualified residents per year for a total of 60 over the grant period.
- b. 95% of residency program graduates will attain either initial elementary certification with additional certification in science or mathematics (Pathway 1) or initial secondary certification in mathematics or science (Pathway 2).
- c. 95% of residents will earn a Master’s degree.
- d. 95% of residents will demonstrate sustained community engagement through participation in a community-based internship during the 15-month program.

(i) Strong Theory and Program Coherence

Drawing upon successful teaching residency models like those developed at California State University Dominguez Hills (98% earning credential and 94% two-year retention rate for CSUDH TQP 2009) and Teaching Residents at Teachers College, as well as analyses of effective residency programs from the Center for Teaching Quality (Berry et al., 2009), UNH-TRRE integrates rigorous graduate-level coursework that leads to a master’s degree, clinical practice tightly aligned with coursework and structured inquiry, a cohort structure that facilitates professional collaboration, and mentoring support that extends through induction.

Decades of research on student academic achievement highlight the importance of the teacher’s ability to bridge the knowledge and values that students bring to the classroom with academic content and competencies (Darling-Hammond & Bransford, 2005). UNH-TRRE integrates knowledge of students, families, schools, and communities to prepare teachers to

support student achievement in rural high-need schools. The program provides through-lines of support in the form of coursework and experiences, which build upon the coherence of the cohort structure, the importance of building community “rootedness” into teacher preparation, and the synergy of its three foundational pillars.

TRRE’s first pillar of *content and pedagogy* rests on the premise that all students deserve access to high-quality core content instruction that is differentiated to meet their needs, grounded in research, and provides increasingly intensified tiered levels of instructional and behavioral support. Teaching Residents (TRs) will learn content and pedagogy through a focus on discipline-specific pedagogy. UNH-TRRE curriculum aligns with New Hampshire reform-based standards, such as the Next Generation Science Standards (NGSS) and Common Core State Standards in mathematics, that emphasize pedagogy that provides opportunities for all students to engage in discipline-specific approaches (including evidence-based practice and high-leverage practices) and highlight reasoning skills and authentic experiences. TRs will develop knowledge of formative and summative assessment practices to use data to inform instruction. Additionally, a strong, iterative emphasis on UDL further underscores this pillar. UDL helps address individual learner variability through the implementation of flexible goals, methods, materials, and assessments that empower educators to meet these varied contextual student needs. UDL-centered curricula are designed to meet the needs of all learners, making costly post-hoc modifications unnecessary, while promoting student engagement and competence (CAST, 2011).

Our understanding of a “cohort” model anchors the program’s second pillar of *clinical strength* by explicitly building upon UNH’s 42-year history with yearlong teaching internships at the graduate level. Since 1974, the UNH teacher preparation program has continuously refined its yearlong clinical model of integrating collaborative supervision and mentoring teams within

clinical partnership sites to facilitate functional groupings (cohorts) for support and shared reflection (Andrew, 2002; Oja, 2010; Oja, Diller, Corcoran & Andrew 2010). UNH-TRRE TRs will have multiple opportunities to form and interact as a cohort in clinically-rich settings. Beginning in the first summer, TRs will engage in observations across multiple rural, high-need schools. In the residency placement, UNH-TRRE will use a twofold cohort structure, integrating site-specific Pathway Cohorts of 3-5 TRs that meet three times each month and a single Residency Cohort, which brings all TRs together once a month. Educator Rounds (peer observations and structured debrief) as a core practice in each pathway cohort's clinical experience reflects its demonstrated effectiveness in fostering "cultures of collaboration" (Marzano, 2011) and enhancing professional inquiry around authentic problems of practice (Goodwin, Del Prete, Reagan & Roegman, 2015; Watts & Levine, 2011). Following completion of the program, graduates will be supported through ongoing induction mentoring support in and out of the classroom.

Preparing teachers for long-term effectiveness in high-need rural areas of New Hampshire requires that they engage with the knowledge of the different contexts their students encounter in their everyday lives. The project's third pillar of *community and family competence in rural teaching* emphasizes a proactive problem-solving stance of civic engagement aimed toward fostering a more sustained TR investment in their local community. Developing teachers' abilities to engage and support student learning in rural communities requires a number of related strategies, all of which emphasize (1) drawing on the strengths of rural communities to bridge school-based and locally-valued knowledge and practices and (2) building community "rootedness" into teacher preparation (Hammer et al., 2005). Preparing teachers in ways that are integrated with existing community practices builds teachers' social capital in rural communities,

which promotes both student learning and teacher efficacy, while also building a base of local professional support for the teacher in the community (Adams & Woods, 2015; Hargreaves et al., 2015). This cross-context sensibility in education makes for more capable students and more capable teachers as they develop “knowledge, sensitivities, awareness, skills, attitudes, and abilities that will allow them to feel more at home and more powerful in a rural setting” (White & Reid, 2008, p. 6). Research also suggests that community outreach by teachers can effectively promote parent engagement and support students’ academic achievement (Semke & Sheridan, 2012).

This conceptual through-line will be enhanced through collaboration with North Country Listens, a community-based initiative of UNH’s **Carsey School of Public Policy** that partners with individuals, organizations, and communities in rural NH to increase participation in public life and improve community problem solving. Additionally, UNH-TRRE’s Director of Community Engagement will collaborate with **UNHCE’s** Youth & Family program staff to coordinate residents’ internships within a network of community-based organizations as a means to facilitate their ability to access local resources and provide meaningful integration between school and community, continuing into their induction years.

Collectively, the three pillars support UNH-TRRE’s mission to prepare STEM teachers who possess strong content and pedagogical knowledge and integrate teaching and learning opportunities that build on rural communities’ cultural and social capital. UNH-TRRE draws on research of rural communities as rich sites for STEM learning (Avery, 2013; Avery & Kassam, 2011), as well as studies that highlight the pairing of active community engagement with high quality professional training to increase rural teacher retention (Adams & Woods, 2015).

Scope and Sequence of Coursework and Clinical Experiences

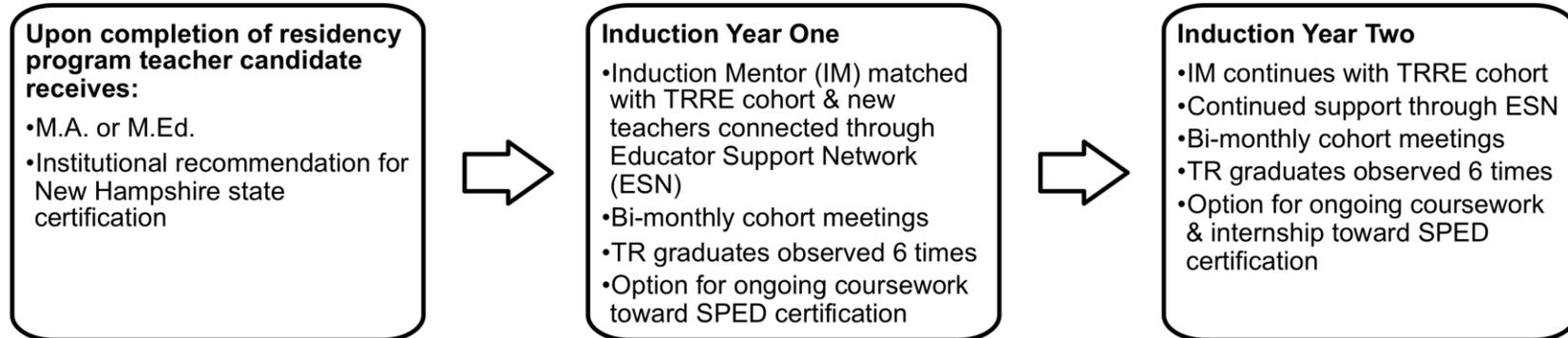
UNH-TRRE will prepare 60 highly qualified teachers across four cohorts over the five-year grant period. Each UNH-TRRE cohort, ranging from 10-20 TRs, will complete the residency program over 15 months, from May (Year 1) through August (Year 2), followed by a two-year induction program (see Figure below).

	RESIDENCY				INDUCTION	
	Summer 1 (Institute)	Residency Placement	Summer 2	Certification & Master's	Induction Yr 1	Induction Yr 2
Yr 1	Cohort 1 (n=10)					
Yr 2	Cohort 2 (n=15)	Cohort 1	Cohort 1	Cohort 1		
Yr 3	Cohort 3 (n=15)	Cohort 2	Cohort 2	Cohort 2	Cohort 1	
Yr 4	Cohort 4 (n=20)	Cohort 3	Cohort 3	Cohort 3	Cohort 2	Cohort 1
Yr 5		Cohort 4	Cohort 4	Cohort 4	Cohort 3	Cohort 2
Yr 6					Cohort 4	Cohort 3
Yr 7						Cohort 4

TRs will engage in: nine-week Community and Clinical Summer Institute focused on fostering community engagement and developing pedagogical competence for rural teaching; a yearlong residency experience; pedagogical coursework required for TRs’ specific certification areas; and professional development and community-engagement activities in the areas of STEM and special education. Both the K-8 and 7-12 certification pathways allow for coursework that can lead to an additional NH certification in special education during the induction period.

Program Timeline: UNH Teacher Residency for Rural Education (UNH TRRE)

Summer 1 12 credits	Fall (+12) 24 credits	Spring (+8) 32 credits	Summer 2 (+4-8) 36-40 credits	
<p><u>May-July:</u> 9-week Community and Clinical Summer Institute</p> <ul style="list-style-type: none"> • 3 courses (<i>EDUC 942</i>, <i>EDUC 851</i>, <i>EDUC 935</i>¹) • School visits and placement for Teacher Residency • TR matched with Community Mentor (CM) within network of CBOs <p>Pillar 1, Pillar 2, Pillar 3</p>	<p>Residency with TR cohort seminar (<i>EDUC 900</i>, 4 cr)</p> <ul style="list-style-type: none"> • 3 days in school • Residency Supervisors observe TRs 4x • Educator Rounds <p>2 courses (8 cr)</p> <ul style="list-style-type: none"> • Pathway 1: <i>EDUC 803RS</i> or <i>MATH 623</i> & <i>EDUC 806</i> • Pathway 2: <i>EDUC 891</i> (science) or <i>MATH 709</i> (math) & <i>EDUC 807</i> <p>CBO network activities</p> <p>Pillar 1, Pillar 2, Pillar 3</p>	Optional J-Term online course in Special Education: <i>EDUC 850</i>	<p>Residency with concurrent TR cohort seminar (<i>EDUC 901</i>, 4 cr)</p> <ul style="list-style-type: none"> • 4 days in school • Residency Supervisors observe TRs 8x • Action Research Cycle • NH TCAP <p><i>EDUC 885</i></p> <p>CBO network activities</p> <p>Pillar 1, Pillar 2, Pillar 3</p>	<p>Complete any remaining certification coursework (e.g., <i>EDUC 801</i>)</p> <p><i>EDUC 856</i></p> <p>Prepare for new school year</p> <p>Pillar 1, Pillar 2, Pillar 3</p>



¹ *Italicized* courses signify **core** courses required of all TR cohorts. Non-italicized courses signify **pathway-specific** certification courses.

Summer Semester 1: Community and Clinical Summer Institute.

Summer Semester 1			
Nine-week Community and Clinical Summer Institute <i>Developing community and pedagogical competence for rural teaching</i>			
EDUC 942: Sociocult. Persp. on Tchng & Lrning	4	9 weeks/M/2.5 hrs + 12hrs/wk fieldwork in community-based organization (CBO)	Late May-July
EDUC 935: Exploring Teaching	4	9 weeks/Tu/2.5 hrs + visitations & fieldwork in school district settings	Late May-July
EDUC 851: Educating Exceptional Learners	4	9 weeks/ Hybrid: alternate Th/2.5 hrs face-to-face & online	Late May-July
<i>Total graduate credits, Summer Semester 1: 12 credits</i>			

TRs will complete coursework that includes both community-based and school-based fieldwork designed to establish a preliminary foundation of (a) *content and pedagogy* with a focus in EDUC 851: Educating Exceptional Learners on developing TRs’ ability to provide high quality core content instruction for all students, including those with disabilities, using evidence-based and high-leverage practices, while employing principles of UDL (Pillar 1 with Special Education emphasis); and (b) *community competence in rural teaching* (Pillar 3), providing TRs with an orientation to educational practice that blends the work of schools and community interests and values. The Summer 1 community-based internship and ongoing community activities that continue through the residency are poised to develop the “rootedness” and active community engagement that, when in complement with high quality professional training, have strong links to teacher retention in rural areas. Under the coordination of UNH-TRRE’s Director of Community Engagement, **UNHCE’s** Youth & Family program staff will connect TRs to a Community Mentor within a network of rural community-based organizations (e.g., 4-H). UNH Cooperative Extension will also provide professional development and other opportunities for TRs to create innovative curricular links between their classrooms and out-of-school activities. This community internship will serve as the field-based component of EDUC 942: Sociocultural

Perspectives on Teaching and Learning (with continued engagement during the academic year).

In late May and early June, as part of the clinical component of EDUC 935: Exploring Teaching, TRs will conduct school visits and classroom observations, meet with Teaching Mentors (TMs), principals, and other teachers, and confirm residency placements.

TRs will begin the residency placement at the same time as their Teaching Mentors (TM) begin the school year, participating fully in teacher workshop days prior to K12 students' first day of school. This is a crucial planning and professional development time during which TRs will prepare for the year with their TM. Residency placements end alongside the school year in June. Additionally TRs will continue monthly connections with the community partners in seminars and professional development activities offered by UNHCE staff (e.g., Extended Learning: Social, Emotional & Mindful Learning, Youth mental health first aid).

Fall Semester.

Fall Semester			
EDUC 900: Residency Cohort Seminar	4	15 wks/3 days a week in classroom/seminar on Tu/ 2.5 hrs	Aug-Dec
<u>Pathway 1 (K-8):</u> EDUC 803RS: K-8 Sci Methods or MATH 623: Topics in Math for Tchrs EDUC 806: Intro to Rding Instr	4	15 wks/F/2.5 hrs	Aug-Dec
<i>or</i>	4	15 wks/Th/2.5 hrs	
<u>Pathway 2 (7-12):</u> EDUC 891: Methods of Tching Sec School Science or MATH 709: Tching Math 7-12 EDUC 807: Tching Reading through the Content Area	4	15 wks/F/2.5 hrs 8 wks/online	
<i>Total graduate credits, Fall Semester: 10-12 credits</i>			

TRs will be in the classroom all day Monday and Tuesday and for the first half of each day Wednesday and Thursday. They will meet in the site-specific Pathway Cohort Seminar (n=3-5) three times each month on Tuesday afternoons at a local school site and then once each month as

a Residency Cohort (includes TRs across all sites), also on Tuesdays. As a purposeful means for residents to inquire into their teaching practice, collaborate with colleagues to improve instruction, and interact as part of a learning community, EDUC 900: Residency Cohort Seminar will incorporate Educator Rounds (Del Prete, 2013; Goodwin, Del Prete, Reagan & Roegman, 2015). The residency seminar will also specifically address strategies for teaching and working responsively with linguistically diverse students.

Certification coursework will inform classroom experiences through pathway-specific courses in the areas of science/math and literacy (Pillar 1). Residents in the K-8 Pathway will enhance their in-class literacy instruction through foundational guidance in planning, methods, and diagnostic techniques in EDUC 806: Introduction to Reading Instruction. EDUC 803RS: K-8 Science Methods or MATH 623: Topics in Mathematics for Teachers will inform K-8 TRs' ability to clarify learning goals, design a learning environment, and assess student achievement in science/math in ways that promote both student and teacher reflection and reflect NGSS and CCSS. Reinforcing Pillar 3, these courses purposefully emphasize "learning" instead of "classroom" environment to stress the importance of drawing from experiences and resources both within and beyond the classroom. Residents in the 7-12 Pathway will take either EDUC 891: Methods of Teaching Secondary Science or MATH 709: Teaching Math 7-12 to address national and state standards, reform-based approaches to instruction, the use of technology and crosscutting concepts in STEM teaching, curriculum evaluation, and assessment. In EDUC 807: Teaching Reading through the Content Area, TRs will engage in practical applications for teaching reading through STEM content areas through development of instructional strategies and materials.

With their TMs, residents will attend faculty, department, and committee meetings,

parent conferences, IEP meetings, and professional development workshops. In addition to Educator Rounds, residents will also (a) observe other master teachers’ classrooms to experience varied teaching and learning styles, and (b) be able to substitute teach 10-15 days over the course of the residency year, to enhance awareness of varied instructional settings in the school.

Optional J-Term Online Course in Special Education. TRs pursuing eventual certification in Special Education will have option of taking an intensive online J-Term (UNH’s January term) course, EDUC 850: Educating Exceptional Learners. EDUC 850 provides a lifespan perspective of the social, psychological, physical, and learning characteristics of individuals with exceptionalities, and addresses implications for educational and human service delivery. This option will also be available over the course residents’ induction years.

Spring Semester.

Spring Semester			
EDUC 901: Residency Cohort Seminar	4	15 wks/4 full days a week in classroom/seminar on Tu/ 2.5 hrs	Jan-Apr
EDUC 885: Intro to Assessment	4	15 wks/F/2.5 hrs	Jan-Apr
<i>Total graduate credits, Spring Semester: 8 credits</i>			

TRs will be in the classroom all day Monday through Thursday. The cohort seminar and accompanying coursework will emphasize residents’ demonstrated knowledge of diagnostic, formative, and summative assessments to improve student learning. Informing these activities, EDUC 885: Introduction to Assessment will focus on how to design and administer formative and summative assessments within classrooms, design and implement learning and assessment activities within a competency-based model, use data to inform instruction, and interpret and use standardized assessment data in classrooms and schools. During the spring semester, as one of multiple measures necessary for recommendation for certification, residents will pass the NH

Teacher Candidate Assessment of Performance, a statewide performance assessment requiring them to build on *knowledge of their students* to plan a series of integrated lessons, videotape their *instruction* and the ways they *support student learning*, *assess* and *analyze* student work, and *reflect* on the teaching and learning experience. As a culminating demonstration of professional knowledge, skills, and systematic reflection on their practice, TRs will complete an action research cycle as a component of EDUC 901: Residency Cohort Seminar, in which they will collaborate with school-based professionals to develop and implement evidence-based interventions for high and low-achieving students, analyzing data and communicating results to colleagues in a professional development session.

Summer Semester 2.

Summer Semester 2			
EDUC 856: Supporting Families of Individuals with Exceptionalities	4	5 weeks/MW/2.5 hrs	Late May-June
Additional coursework for Masters degree (e.g., EDUC 801: Human Development and Learning)	4		
<i>Total graduate credits, Summer Semester 1: 4-8 credits</i>			

Coursework will re-emphasize Summer Semester 1’s focus on collaborating as a member of the larger community with learners, families, colleagues, and community agencies to leverage resources that contribute to student growth, development, and wellbeing (Pillar 3). EDUC 856: Supporting Families of Individuals with Exceptionalities emphasizes proactive collaboration with families as a means to engage residents with family system theory and address issues of diagnosis and prognosis, coping strategies, communication and team collaboration, cross-cultural competence, and services for children with disabilities. TRs needing to complete any remaining certification coursework (e.g., EDUC 801: Human Development and Learning) can do so during Summer Semester 2.

Teaching Resident Recruitment and Selection

Our recruitment and selection reflect our aim of identifying TRs who possess qualities that research has shown are related to student achievement, such as strong content preparation, superior academic skills, motives to teach that include a strong social commitment to contribute to society through education, demonstrated ability to interact positively with children, and well-developed communication skills (Abrams & Andrew, 2010). Positive evaluations from early direct experience with children in educational settings form an essential criterion for admission.

UNH-TRRE will also capitalize on effective approaches for retaining teachers in rural areas that include recruitment of teachers from local talent pools in rural areas (Gagnon & Mattingly, 2015), where TRs can build high-quality pedagogical expertise as well as cultural and social capital (Hammer et al., 2015). This approach complements the strengths of rural communities in ways shown to support student achievement (Leana, 2010). By working closely with partner LEAs and schools, NEA-NH, and NCES to target existing local talent such as qualified paraprofessionals and mid-career changers in rural New Hampshire, UNH-TRRE responds proactively to two leading factors undermining rural teacher retention: social and geographic isolation (Hammer et al., 2015). In targeting individuals from these groups, we will direct special attention to those with math, science, engineering, computer science or technology degrees or background. To increase the number of STEM teachers in general and increase equal representation across gender, UNH-TRRE will actively recruit from the College of Engineering and Physical Sciences (CEPS) STEMbassadors, a team of more than 40 CEPS students dedicated to providing inspiration, role models and hands on STEM activities to K-12 students. Two additional UNH student groups, the Society of Women Engineers (SWE) and the Society of Asian Scientists and Engineers also perform middle school outreach. These groups already enjoy

some aspect of teaching and provide potential TRs for UNH-TRRE.

Finally, as we also target recent graduates, we will collaborate with the National Science Foundation-funded *Noyce Scholars* program within the **UNH College of Engineering and Physical Sciences** and its **Department of Mathematics and Statistics**. Noyce provides scholarships to qualified juniors and seniors as they complete their STEM-related degrees. Noyce scholars' teaching obligations align with TQP Absolute Priority 2 requirements.

We have designed a rigorous application process that builds upon the thoughtful, valid and reliable process embedded within our standard application to the UNH graduate program in teacher education and also targets evidence of the candidate's dispositions, strong verbal and written communication skills, and commitment to working in high-need rural contexts. The *first* component entails completion of the standard Graduate School application that focuses on whether applicants meet core content knowledge requirements in their undergraduate experiences, in addition to the further program admissions criteria detailed on page 4: Minimum 3.0 UG GPA, passing score on Praxis CORE exam, positive evaluations from 60-hour classroom practicum (i.e., evidence linked to effective teaching), three academic and work-related letters of recommendation, and a written statement. All students admitted to the residency program must be grounded in liberal arts coursework that culminates in an undergraduate degree in the area of intended area of certification (i.e., mathematics or science). If applicants have not completed a classroom practicum or the equivalent, they may be provisionally admitted into UNH-TRRE, pending successful completion of EDUC 935 in the first summer.

The *second* component applies specifically to the teaching residency program and will entail both a written application consisting of short essay questions and a formal interview (in person or via video conferencing) in which applicants must communicate their beliefs about

education and schooling and also address how their qualities and experiences will help them positively impact the academic achievement and social development of students in high-need, rural communities. This process will be overseen by a Residency Program admissions committee comprised of members of the UNH-TRRE management team. Overall, the two-stage process will ensure that we only admit candidates who have the knowledge, skills, and professional dispositions to successfully handle the rigor of graduate study and the intensity of a residency program, while appropriately addressing the academic needs and cultural assets of students in rural contexts. Our process will also ensure that applicants thoroughly understand the obligation to teach for three years in a high-need rural school.

Stipends, Teaching Obligation and Repayment. UNH-TRRE residents will apply for and receive stipends of \$28,000 over 12 months with installments each semester, a 50% tuition scholarship toward UNH-TRRE coursework, and a laptop. They will sign an agreement that details all the provisions in Absolute Priority 2(c)(3). The UNH-TRRE program manager will track hiring and monitor placement to ensure that participants teach for three years in a rural high-need school. We will require participants to provide written proof of employment from the district at the start and end of each school year. Additionally, the agreement will state that those failing to complete the credential, master's, or teaching requirements will repay the stipend, pro rata, unless the TRRE partners approve the participant's request to consider extraordinary circumstances. Any returned funds will be applied to TRRE activities.

Teaching Mentor Selection, Training, and Support

Each resident will be paired with a Teaching Mentor (TM) from a partner school who has undergone a rigorous selection process, which includes an application, observation of their classroom practice, an interview, and principal's recommendation. This process is designed to

ensure that prospective TMs' classroom practice aligns with program goals and coursework and that TMs have 3+ years of teaching experience with full licensure in the subject area(s) sought by the TR. Principal recommendations and an observation protocol (including analysis of lesson plan) will be aligned with selection criteria including a prospective TM's ability to: collaborate with colleagues to improve instruction; use multiple strategies to assess students' academic needs and strengths; create learning experiences that make the discipline(s) accessible and meaningful for learners; engage and support students with different learning styles; use a variety of strategies and tools to encourage learners to develop deep understanding of content areas and their connections to other disciplines; analyze gains in student learning based on multiple valid and reliable measures; and use evidence to continually evaluate his or her practice, particularly the effects of choices and actions on students, families, and other learning community professionals.

TMs will participate in meetings to learn about mentor roles and responsibilities as a component of school site visits by members of the UNH-TRRE management team and the UNH Department of Education Office of Field Experiences staff. In August 2017 prior to the start of the residency, TMs will have a three-day orientation session that will cover the co-teaching model; scope and sequence of the TRs' coursework to ensure consistency and alignment with teaching activities; strategies for problem solving, conflict resolution, and communication; and how to work with the residency supervisor to ensure a coordinated growth experience for TRs.

During the residency, TMs will engage with the UNH residency supervisor in monthly support and professional development meetings organized by cohort. These meetings, for which TMs will receive compensation, have a twofold aim: (1) Shared reflection on their day-to-day work with their TR, including solution-oriented discussion around challenges and opportunities of mentoring; and (2) ongoing professional development in mentoring and collaborative

supervision practices. TMs will also attend three one-day retreats over the course of the year (Fall, Spring, June) focused on specific dimensions of their TM role (e.g., feedback strategies when observing TRs) and their own professional development (e.g., trainings in inquiry-based teaching offered by **the UNHCE Science Literacy team**).

Residency Supervisors. UNH residency supervisors will serve as a crucial pedagogical bridge between field-based residency personnel and the university, and will work closely with TMs, TRs, and UNH faculty. In addition to facilitating the weekly TR seminars and Educator Rounds, supervisors will observe each TR within their cohort at least four times between September and December and at least six times from January to the end of the school year. Each observation, mirroring the inquiry-based format of Educator Rounds, will focus on “questions of practice” jointly identified by the TR, TM, and supervisor. As previously indicated, supervisors will also facilitate monthly support and professional development meetings for TMs within their cohort.

The UNH Director of Pedagogy and Clinical Experience will oversee selection and training of supervisors as well as support residency supervisors in their own professional development by facilitating bi-monthly “SUPE Group” meetings. Residency supervisor qualifications may include university faculty status and/or 5+ years of teaching experience in rural schools in one or more of the residency program certification areas.

(ii) Collaboration of Appropriate Partners for Maximizing the Project Effectiveness

The project’s success is bolstered by the collaboration and support of multiple appropriate partners, whose commitment is evidenced in letters of support. Many of the partners are cited (and **bolded**) throughout the preceding sections on program design. In addition:

- **UNH College of Liberal Arts** will provide 50% tuition scholarship for 60 teaching residents and cover the cost for two Graduate Assistants each year for the duration of the grant.

- **UNH Department of Education** will contribute faculty time and resources to the management team; dedicate one Graduate Assistant each year for the grant period; design and implement the UNH-TRRE curricular scope and sequence; manage daily operations; oversee the admissions, orientation, and placement processes; coordinate induction; and collaborate with UNH-TRRE partners. (See Management Plan for further details.)
- **UNH Department of Mathematics and Statistics**, housed within the **College of Engineering and Physical Sciences (CEPS)**, will review/revise curriculum for the elementary (k-8) math and secondary (7-12) math pathways, including design of rural-specific math courses; provide faculty and in-kind support to teach methods courses; serve on the TRRE advisory committee. CEPS's *Noyce Scholars Program* will recruit, advise and prepare students to earn science or math degrees so they are prepared to join TRRE.
- **UNH Cooperative Extension** family and youth staff will coordinate residents' placements with 4-H and other community-based organizations within its established network to facilitate meaningful integration of resources and learning opportunities between school and community. **UNHCE's** Science Literacy team will offer STEM professional development trainings for residents, residency graduates, TMs and IMs.
- **UNH Joan and James Leitzel Center's STEM Teachers Collaborative** will generate STEM professional development opportunities for TMs and TRs in and beyond their induction years through: (a) Developing online graduate courses in technology integration and more accessible online graduate-level options in STEM, including options toward a STEM-focused graduate certificate (e.g., Computing Education, Technology Integration); (b) programs that take place in a variety of hands-on settings in the community, summer camps, the STEM Discovery Lab, and research experiences at UNH with STEM faculty; and (c)

hosting an annual statewide forum on STEM professional development topics that teachers identify as timely. The STEM Teachers Collaborative and UNHCE's Science Literacy team work closely together.

- **New Hampshire/North Country Listens**, a community-based initiative of the **Carsey School for Public Policy**, will provide a yearlong forum integrating **UNHCE** activities to help orient residents to civic engagement and community problem solving in local contexts.
- **UNH Carsey School of Public Policy** will provide faculty and in-kind support and serve as the external evaluator for this project.
- **High-need rural partner LEAs SAU 3, 20, 30, 36** and **high-need partner schools** will collaborate with UNH TR recruitment; serve as residency placement sites and collaborate with UNH on mentor teacher recruitment ; provide in-kind support through time, space, shared resources, and professional development for TRs or residency graduates of the residency program; and hire qualified graduates as positions become available.
- **NH Department of Education (NHDOE)** will provide: support in accessing and managing data tied to K-12 student achievement data, teacher hiring and retention, and certification area needs; direct financial support in the form of \$10,000 each year; and personnel support from their teacher educator program approval, special education, Title I, Title 2, and certification divisions.
- **National Education Association-NH (NEA-NH)** will work with UNH-TRRE to tailor its existing school-based mentor training programs to the needs of mentors and residency graduates and deliver induction training for all participants during their induction period for the duration of UNH-TRRE.

(iii) Project is designed to build capacity and yield sustainable results

Design Connected to Impact—Goal 2: UNH residents will be hired and remain as teachers in high-need schools.

The Induction Program

Research suggests that teachers, especially those new to the profession, move out of rural high-poverty schools at a disproportionately high rate (Darling-Hammond & Sykes, 2003; Gagnon & Mattingly, 2012; Hanushek, Kain, & Rivkin, 2004). Studies also show that beginning teachers who are provided with multiple supports, mentoring programs, and collective group and networking activities, and who, in particular, *collaborate with other teachers on instructional matters*, are less likely to move to other schools and less likely to leave the teaching occupation altogether after their first year (Fletcher & Strong, 2009; Ingersoll & Strong, 2011). Informed by these perspectives and grounded in the premise that collaboration in the form of inquiry-driven research for improved practices is how teachers most effectively sustain their professional growth (Cochran-Smith, 2005), the UNH-TRRE induction program will extend the cohort model into a framework of sustainable professional development activities focused on pedagogical support for both new and experienced teachers. In building the capacity of local schools to support *all* teachers and enhance teachers' social capital in their rural communities, the induction program will promote knowledge, sensibilities, and skills that will allow new teachers “to feel more at home and more powerful in a rural setting” (White & Reid, 2008, p.6).

The primary goal of induction will be to support participants as they learn to implement evidence-based, high-leverage practices (Ball & Forzani, 2009) to positively impact student achievement, acquire strong content knowledge, utilize data to inform instruction, apply concepts of UDL, and draw on community and family competence in rural teaching. In both induction

years, TRs will be assigned a UNH Induction Mentor (IM) and network—virtually and in-person via bi-monthly cohort meetings—to facilitate the sharing of resources and dialogue around teaching and strategies for supporting students and families. This educator support network will be facilitated through the joint coordination and resources of **UNH** and **North Country Education Services (NCES)**. Depending on geographic distribution of UNH-TRRE graduates hired in partner high need LEAs, each IM will mentor 3-5 new teachers and will bring his/her cohort together every other month for support meetings and professional development. IMs will visit cohort participant classrooms at least six times over the course of the year for observation and instructional coaching, as well as co-planning and team-teaching.

The Induction Coordinator will oversee a rigorous application for IMs similar to that for TMs, and will also facilitate periodic IM support meetings and professional development modules on research-based mentoring practices such as Lesson Study (Lewis, Perry & Murata, 2006), Educator Rounds, and Instructional Coaching (Carlisle & Berebitsky, 2010; Marzano & Toth, 2013). In addition, **UNHCE**, **UNH STEM-Teachers Collaborative**, and **NCES** will provide opportunities to attend training modules on STEM-related topics; to pursue STEM-focused graduate certificates (e.g., Technology Integration); or to engage in research experiences at UNH with STEM faculty. The Inquiry Methods course taught by **UNHCE's Science Literacy faculty** will provide a series of professional development workshops designed for participants to modify their existing curriculum to align with *Next Generation Science Standards (NGSS)* expectations and integrate NGSS science practices into their curriculum (NGSS Lead States, 2013).

Special Education certification option. TRRE graduates pursuing additional certification in Special Education will be able to integrate coursework and supervised clinical work during their

second induction year. In addition to residency coursework, the following combination of on-site and online courses will be offered to complete their credential requirements including EDUC 939: Assessment of Students with Learning Disabilities, EDUC 940: Methods of Teaching Students with Learning Disabilities, and EDUC 900/901CL Internship and Seminar in Special Education.

Design Connected to Impact—Goal 3: Students of UNH residency program graduates will outperform students of non-participating math and science teachers in rural New Hampshire—matched by experience.

Rigorous content and pedagogical preparation, intensive field experiences in rural high-need partner schools, high levels of mentoring and networking support, and ongoing professional development among all participants will increase student achievement in mathematics and science as listed in Goal 3. As detailed further in our Evaluation Plan, through continued collaboration with NH DOE and partner LEAs to obtain student- and teacher-level data, the **Carsey School of Public Policy** will have access to all standardized achievement results of students taught by UNH-TRRE graduates, as well as the teacher-linked results of all students in the state that complete the same assessments. Student data will be disaggregated by subgroups. District and school-level data for target schools, demographically matched schools, and schools statewide are available online from the NH DOE's Bureau of Accountability and Assessment. Given the small sample size of the number of TRs who will complete the residency program, the external evaluation team will wait until the final award year to pool student achievement data.

Design Connected to Impact—Goal 4: UNH, the NH DOE and partner LEAs will develop and sustain the project's partnerships and institutionalize its reforms.

UNH-TRRE is designed to build long-term collaborative capacity throughout the partnership

schools, school districts and surrounding communities, and is committed to understanding and replicating successful elements of its program to inform future iterations of the residency program, as well as UNH's other teacher education programs. By developing mutually beneficial partnerships with the high-need rural partnership schools, engaging both residents and participating teachers in high-quality professional development opportunities, research, networking, mentoring relationships and community partnerships, UNH-TRRE will provide a means of *building local and institutional capacity* for ongoing school and program improvement. Program participant surveys carried out the internal and external evaluation teams (see Evaluation Plan) and focused on the demonstrated value and sustainability of UNH-TRRE may identify evidence of new or existing opportunities by LEAs and the NH DOE to support grant activities (e.g., how district administrators might draw upon funds for the program currently allocated in school budgets for mentoring, induction, and PD). UNH will particularly target (a) curriculum revisions aligned with current standards and instructional models (NGSS, CCSS, competency-based education); (b) community-based partner and TR collaborations as an integrative component to be incorporated into other teacher preparation programs as a model for engaging parents in school life and enhancing academic and educational enrichment services; and (c) elements of induction mentoring and the educator support network as an institutionalized component for graduates of UNH's other teacher preparation programs.

C. 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, including clearly defined responsibilities, timelines, and milestones for accomplishing project tasks

UNH will be the lead applicant and fiscal agent. UNH, NHDOE, NCES, and partner high-

need LEAs and schools will formalize their partnerships with MOUs documenting roles, responsibilities and resources allocated to the project. The combined **management team** and an **advisory council** structure will ensure that all partners and relevant stakeholders can provide input, and guidance into the implementation of the residency program, as well as ensure that UNH-TRRE will accomplish project tasks within budget and according to specified timelines.

The **management team** will facilitate day-to-day operations and provide a continuous feedback loop into project guidance and operations. The UNH-TRRE PI will have fiscal and administrative responsibility for the grant and will lead the management team. Along with the PI, the management team will consist of the Co-PI, Program Manager, Director of Pedagogy and Clinical Experience, Director of Community Engagement, Director of Science and Mathematics Education, Coordinator of Special Education and Induction Coordinator. The management team will meet weekly to coordinate the various components of UNH-TRRE and will ensure that responsibilities and activities are clearly defined and implemented.

The **advisory council** will coordinate with members of the management team to monitor progress, provide feedback, plan long-range implementation and institutionalize activities of the residency program. The advisory council will convene semi-annually and will consist of representatives from the various partners involved with UNH-TRRE including, the PI, Co-PI, Program Manager, UNH Department of Mathematics and Statistics, UNHCE, UNH Leitzel Center, NH DOE, NCES, LEAs, school principals, residency supervisors, and TMs.

The program timeline, aligned with the program goals and logic model, lays out a step-by-step plan to carry out and continuously improve UNH-TRRE.

UNH-TRRE Program Timeline

Activities	Timeline	Personnel	Evidence
Goal 1. UNH-TRRE will recruit and prepare 60 highly qualified math and science teachers with skills matched to the needs of students in the high-need partner LEAs (Activities repeat annually, as needed)			
Management Team meetings	October 2016, weekly	Management Team	Mtg. Minutes
Advisory Council meetings	November 2016, semi-annually	Advisory Council	Mtg. Minutes
Post position and hire Program Manager	October - December 2016	PI, Co-PI	Project records
Develop UNH-TRRE website	December 2016	Program Manager	Website
Advertise UNH-TRRE at UNH and in rural LEA partner communities, offer informational meetings and recruit applicants to UNH-TRRE	October – December 2016, monthly through Year 4	Program Manager, PI, Co-PI, Dept. of Mathematics and Statistics, CEPS, Noyce Scholars, NCES, NEA-NH	Project records, Website
Application deadline for prospective residents	December 15, 2016 & January 15, 2017	Program Manager, PI, Co-PI	Mtg. minutes
Review prospective resident applications and admit residents (Year 1: 10-12/Year 2: 15-17/Year 3: 15-17/ Year 4: 18-20)	January 2017 – February 2017 Yearly	Management Team	Project records
Revise curriculum for UNH-TRRE integrating NGSS, CCSS, UDL, and rural and community competence into coursework and residency activities	October 2016 – April 2017	Management Team, Faculty from the Department of Mathematics and Statistics	Course syllabi
Tour partner schools and introduce UNH-TRRE to prospective residency placement schools and mentor teachers, school partner applications and teaching mentor bios	November 2016 – March 2017	Director of Ped & Clin. Exp Director of Field Experiences Field Placement Coordinator, Partner high-need school administrators, partner high-need school teachers	Project records
Coordinate with UNHCE and	November 2016	Director of Community	Project

community-based organizations to identify possible community-based internship partners	– April 2017	Engagement, UNHCE staff	records
Residency observation and placement schools selected	April 2017	Director of Ped & Clin. Exp Director of Field Experiences Field Placement Coordinator	Project records
Orientation for residents	May 2017	Management Team	Project records
Residents begin initial field placement and begin resident-mentor match process	May 2017 – June 2017	Director of Ped & Clin. Exp Director of Field Experiences Field Placement Coordinator	Project records
Residents complete 9-week Community and Clinical Summer Institute and community-based institute	May 2017 – August 2017	Director of Community Engagement, Coordinator of Special Education, Director of Ped. & Clinical Exp.	Project records, course syllabi
Residents participate in residency placements	August 2017 – June 2018	Management team, LEA partner and school staff,	Project records, course syllabi
Orientation for teaching mentors and needs assessment for PD for teaching mentors	August 2017	Teaching Mentors, Director of Ped. & Clinical Exp., University Supervisors	Orientation agendas and needs assessment data
Mentoring for residents and PD opportunities for mentors	August 2017 – June 2018	Teaching Mentors, Director of Ped. & Clinical Exp., University Supervisors, Director of Science and Math, UNHCE staff	Project records
University supervision for mentors	August 2017 – June 2018	Director of Ped. & Clinical Exp., University Supervisors	Project records
Residents complete coursework and requirements for NH certification	August 2018	Management team	Student files
Residents are endorsed by UNH for initial certification	August 2018	Coordinator of Accreditation	Project records

Surveys after summer, fall and spring terms	August 2017, December 2017, June 2018	Co-PI, Evaluation Team	Surveys
Focus groups of residents, supervisors, teaching mentors, and external partners	June 2017	Management Team, External evaluation Team	Focus group protocols
Review of outputs, short-term and annual outcomes, program improvement advisory council retreats	September 2017, July 2018 (annually to follow)	Management Team, Advisory Council	Survey reports, focus group themes project records, Mtg. minutes Website
APR	Annually	PI, Co-PI, Program Manager	Annual reports
Goal 2. UNH-TRRE graduates will be hired and remain as teachers in high-need rural schools (Activities repeat annually, as needed)			
Hire or select Induction Coordinator from UNH faculty or staff	June 2017	Management Team	Project records
Design induction and mentoring curriculum	June 2017 – May 2018	Induction Coordinator, Director of Science and Math, Special Education Coordinator, UNHCE staff, NCES staff	Project records
Hire Induction Mentors	May 2018 - August 2018	Induction Coordinator	Project records
Support for UNH-TRRE (anticipated) graduates in finding and securing jobs in rural, high-need partner LEAs	April 2018 – August 2018	Induction Coordinator, NCES staff, Partner LEA and school staff	Project records
Induction and Mentoring (Cohort 1: First year)	September 2018 – June 2019	Induction Coordinator, NCES staff, UNHCE staff, Coordinator of Special Education, Director of Community Engagement	Project records
Induction and Mentoring (Cohort 1: Second year)	September 2018 – June 2019	Induction Coordinator, NCES staff, UNHCE staff, Coordinator of Special Education, Director of Community	Project records

		Engagement	
Surveys and focus groups after year of teaching	June 2019	Co-PI, External Evaluation Team	Surveys, focus group protocols
Review of outputs, short-term and annual outcomes, program improvement retreats	July 2019	Management Team, Advisory Council	Survey reports, focus group themes project records, Mtg. minutes Website
Goal 3. Students of UNH-TRRE graduates will outperform students of non-participating novice math and science teachers in rural New Hampshire. (Activities repeat annually, as needed)			
Access student- and teacher-level data from the NH DOE, LEA and school partners	July 2019, Annually	External Evaluation Team, NH DOE staff, LEA and school partner staff	Data files, project records
Analyze student achievement data	July 2021	External evaluation team	Reports
Disseminate analyses and reports to key stakeholders	September 2021	External evaluation team, Management team, Advisory Council	Project records
Goal 4. UNH, New Hampshire Department of Education, rural high-need partner LEAs and schools will develop and sustain the project's partnerships and institutionalize its reforms.			
Disseminate project activities	Ongoing	Management Team	Website, Reports
Coordinate with external evaluators to review instruments and processes for external evaluation	December 2016 (monthly)	PI, Co-PI, Program Manager, External Evaluation Team	Evaluation instruments
Review of outputs, short-term and annual outcomes, program improvement retreats	June 2017, annually	Management Team, Advisory Council	Survey reports, focus group themes project records, Mtg. minutes Website
Revisions to UNH-TRRE	Annually, ongoing	Management Team	Project records

Integrate communication and supports through established structures among partners for ongoing communication and collaboration	Annually, ongoing	Management Team, Advisory Council, NH DOE, NCES, LEA's, UNHCE, STEM-TC	
Pursue new projects among partners	Ongoing	Management Team, Advisory Council, NH DOE, NCES, LEA's, UNHCE, Leitzel Center	Project records; grants obtained
Incorporation of successful pedagogical strategies and UNH-TRRE activities in UNH teacher preparation programs	Annually, ongoing	Management Team, UNH Education Department Faculty,	Project Records, Curriculum review

Key personnel are highly qualified and have relevant training and experience to support the design, implementation, and continuous improvement of UNH-TRRE.

PI: Dr. Leslie Couse (0.27 FTE). Responsibilities: fiscal and administrative management; hire, supervise, and evaluate staff; oversee management team and advisory council. Qualifications: Professor and Department Chair, experience directing large federal grants, including personnel preparation based on close community collaboration. Lead editor on recent *Handbook of Early Childhood Teacher Education* (Routledge, 2016).

Co-PI: Dr. Emilie Reagan (0.27 FTE). Responsibilities: oversee program design and implementation; assist in TR selection; coordinate with partners; oversee internal evaluation, including the design and administration of performance and survey data; coordinate with external evaluation team; teach assessment course to TRs. Qualifications: Assistant Professor of Assessment and Policy in the UNH Department of Education. Teaches assessment, educational policy, and internship and supervision courses. Experience working on a federally-funded residency program (TR@TC) and directing a Spencer Foundation-funded multi-institutional research grant.

Program Manager (1.0 FTE). Responsibilities: day-to-day operations and office management; assist in recruitment, screening, and placement of residents; assist with admission, registration, financial aid, certification applications; manage databases; coordinate with key partners.

Qualifications: At least a Masters degree and relevant teaching experience in science and or mathematics in rural high-need schools. Experience on other grant funded projects.

Director of Pedagogy and Clinical Experience: Dr. Tom Schram (0.27 FTE). Responsibilities: Assist in the selection of residents; guide and supervise clinical experiences; coordinate selection of residency placement schools; coordinate selection and training of TMs and supervisors; revise curriculum for residency seminar; oversee supervision and residency seminar. Qualifications: Associate Professor and Director of Educator Preparation in the UNH Department of Education. Member of NH State Leadership Team for national Network for Transforming Educator Preparation, founder and Vice President of statewide consortium of educator preparation programs, coordinated UNH's successful national accreditation process.

Director of Community Engagement: Dr. Andrew Coppens (0.27 FTE). Responsibilities: Design and coordinate the *community and family competencies* pillar of UNH-TRRE; collaborate with UNHCE and community-based partners to place residents in community-based internships; revise curriculum to integrate cultural competence across coursework and experiences in the residency program; teach socio-cultural perspectives on teaching and learning. Qualifications: Assistant Professor of Learning Sciences in the UNH Department of Education. Expertise in cultural organization of learning, development of motivation in children, and children's integration in or segregation from family and community endeavors.

Director of Science and Mathematics Education: Dr. Diane Silva Pimentel (0.27 FTE). Responsibilities: revise science curriculum to integrate NGSS, CCSS and cultural competence in

rural communities; coordinate with the Department of Mathematics and Statistics on the revision and teaching of mathematics methods courses; coordinate with **UNHCE** and the **Leitzel Center** to support professional development activities in mathematics and science; teach science methods courses to TRs. Qualifications: Assistant Professor of Science Education in the Department of Education. Eighteen years experience as a master teacher of high school science. Expertise in creating professional development opportunities for science teachers that support the implementation of reform-based approaches during science instruction.

Coordinator of Special Education: Dr. Vincent Connelly (0.21 FTE). Responsibilities: revise special education coursework to integrate cultural competence in rural communities; collaborate with other faculty to integrate UDL across coursework; coordinate with NH DOE and support providers to offer induction support in special education; teach coursework in special education during residency and induction. Qualifications: Associate Chair of the UNH Department of Education. Expertise in issues and policy regarding the preparation, recruitment, and retention of special education personnel. Effective methods of instruction in the content areas for students with disabilities, particularly in the area of science.

Coordinator of Induction: TBD (0.21 FTE). Responsibilities: lead the design of induction activities; hire, train and support induction mentors; coordinate with **UNHCE, NH DOE, NCES**, and support providers to offer induction and mentoring support to graduates of the residency program. Qualifications: Ph.D. with experience supporting pre-service and novice teachers through induction, mentoring, and professional development. Additional experience working with school-based partners in New Hampshire.

Additional key personnel: Faculty in the Department of Mathematics and Statistics; clinical faculty and staff associated with UNCE; faculty associated with the Leitzel Center; Application

and Admissions Coordinator; Advisor for Course Enrollment and Registration; Director of Field Experiences; Coordinator of Field Experiences; Grants Manager. As indicated in the budget, NHDOE has also allocated staff and time to the project including: Title II (education consultant), Title I (education consultant), Administrator of Credentialing, Special Education (education consultant), Administrator for Educator Prep programs, Administrator for Data Management.

(ii) The extent to which performance feedback and continuous improvement are integral to the design of the project

Embedded in the project timeline are multiple opportunities for feedback and continuous improvement, including formative surveys administered to residents at the end of each term (summer, fall, spring), focus groups conducted among relevant stakeholders (residents, teaching mentors, supervisors, school and community partners) annually, and annual retreats to review formative evaluation data, short-term and annual intended- and actual outcomes and inform continuous improvement. The Management Team will meet weekly to design and implement the program, discuss issues, review data and make short-term changes. The PI, Co-PI and Program Manager will present semi-annual reports to the Advisory Committee to provide data and continuous feedback on the various program. The Management Team will use internal and external evaluation data to assess progress toward short-term, mid-term and long-term objectives. Regular surveys will be administered to key participants including TRs, TMs, supervisors, school, community, and university partners. The Management Team and Advisory Council will meet annually to discuss data and make recommendations for improvement.

To ensure institutionalization and dissemination, the Management Team will provide updates to the UNH Department of Education at monthly faculty meetings. Review of UNH and community partner services will inform the institutionalization of reforms at UNH.

D. QUALITY OF EVALUATION PLAN

A team from the UNH **Carsey School of Public Policy** will serve as external evaluators for UNH-TRRE. The evaluation team has considerable experience in applied education research and program evaluation, as well as deep knowledge of rural NH from a ten-year research project exploring youth educational and economic opportunities in the state's northernmost county.

The proposed evaluation plan incorporates both qualitative and quantitative data for summative and formative purposes. Evaluators will work in close collaboration with the **UNH Department of Education** to ensure a process of continual improvement over the duration of the program. This will involve frequent electronic and in-person communications between the external evaluation team and the Management Team, with ongoing collaboration with the Co-PI, who will oversee the internal evaluation. Quarterly memos will be issued by the external evaluation team to key program stakeholders, ensuring that challenges are identified, solutions for improvement are generated, and process benchmarks are being met. Annual reports will highlight important data trends as well as major findings regarding the fidelity of implementation of the UNH-TRRE program. The release of these reports will coincide with an annual summer Advisory Council retreat, where all partners and the external evaluation team will meet to review data, discuss challenges, and propose modifications to process mechanisms in subsequent years. Formative evaluation will be coordinated with the internal evaluation team and will serve the additional function of describing the processes that lead to project outcomes. This information will prove helpful in interpreting outcome data and supporting arguments for attribution. Based on the formative and summative information gathered throughout the project, a final report will be issued by the **Carsey School of Public Policy** at the end of the project period.

The summative portion of the evaluation aims to assess the extent to which program

goals are met (see listing of goals on page 1 of this project narrative). Each goal is reflected in UNH-TRRE's expected outcomes. The Logic Model (p.10) illustrates how the resources, activities, and outputs of the program connect to these expected outcomes. In approaching this evaluation we will call on a wide range of data sources, including (1) UNH teacher candidate (resident and traditional candidate) applicant data; (2) Praxis II results (3) certification, placement, and retention data; (4) results from surveys issued to students, UNH teacher candidates, mentor teachers, principals, and partners; (5) structured interviews with major participants; and (6) student achievement scores. UNH has worked to secure data sharing agreements with **NHDOE** and partner LEAs to ensure that these data may be collected.

Measures for Assessing Outcomes

In alignment with the UNH-TRRE logic model, the external evaluators will evaluate the short-term, mid-term, and long-term outcomes of the project.

Short Term Outcomes (STO).

STO 1. Graduates of the program must be able to apply content and pedagogical knowledge as a teacher. The **Carsey School of Public Policy** will examine 1-year persistence rates, the pass rates of Praxis II examinations (target: 95%), graduate GPAs (minimum residency program GPA, 3.0), and rates of graduates who obtain certification within one year of program completion (target: 95%), all of which together serve as a rough proxy for these skills. In addition, surveys issued to mentors as well as residents themselves will be used to help assess the extent to which this outcome is achieved.

STO 2. The UNH-TRRE will aim to prepare graduates that will be hired by partner LEAs to meet critical needs. The needs assessment suggests that qualified science and mathematics teachers are in especially high demand in our partner LEAs. Measures used to assess STO 2

include the percentage of residents who graduate and obtain state certification in mathematics or science (target: 95%) disaggregated by race, gender, and grade level (elementary or secondary); rates of residency graduates who are hired under their certification(s) in partner LEAs following graduation (target: 95%), disaggregated by race, gender, and grade level (elementary or secondary); rates of those who teach science and/or math in partner LEAs following graduation (target: 67%); rates of those who complete certification in special education; and results from a principal survey, which will be modified from an existing survey that has been in programmatic use at UNH for a number of years in order to assess satisfaction with UNH graduates.

STO 3. One of the pillars of the UNH-TRRE model is to integrate residents into the communities in which they teach. Ultimately this improves quality of instruction, increases the odds that teachers will remain in that community, and leads to gains in student achievement. In order to assess this outcome, the **Carsey School of Public Policy** will modify existing instruments in use (e.g., scales such as “community engagement,” “interest in students”) to create annual student and mentor surveys. These surveys will be administered to all students taught by graduates of the residency program, as well as induction mentors, and will quantify the extent to which residents integrate and address the needs and interests of their community into their instruction. In addition, structured interviews will be conducted with relevant partners and external stakeholders. (e.g., NCES members, other community support groups).

Mid-Term Outcomes (MTO).

MTO 1. The best practices which emerge from UNH-TRRE should be incorporated across teacher preparation at UNH. In order to help identify successful pedagogical practices, annual surveys will be administered to residents. These surveys will solicit perceptions of effective strategies, with particular attention placed on the unique circumstances of teaching in a

rural, high-need environment. Structured interviews will also be conducted with a sample of residents, and qualitative coding strategies will be used to elevate important themes that emerge. The UNH teacher preparation program will adapt the curriculum based on the findings of these evaluation activities. The **Carsey School of Public Policy** will cross compare components of the UNH-TRRE program with components of UNH's traditional teacher preparation that were adopted during the grant period. This process will utilize primary and secondary data sources to assess if such improvements were made, including course syllabi, standard operating procedures, and interviews with key UNH personnel.

MTO 2. The preparation of skilled residents who are immersed in the communities in which they serve should lead to relatively high rates of teacher retention. We will examine 1-year retention rates within a rural, high need partner LEA (target: 90%) and 3-year retention rates within a rural, high need partner LEA (target: 90%). The external evaluation team will calculate retention rates with respect to the total number of residency graduates who are hired by rural, high-need partner LEAs.

MTO 3. Successful aspects of UNH-TRRE induction should become institutionalized across its partnership organizations. A number of data sources could assess this mid-term outcome, including interviews with key partners or meeting minutes from annual retreats. This outcome will be evaluated in coordination with the internal evaluation team.

Long-term Outcomes (LTO)

LTO 1. Ultimately, high-quality preparation of talented teachers should lead to improved student achievement in science and mathematics. The **Carsey School of Public Policy** will obtain all standardized achievement results of students that are taught by UNH-TREE graduates, as well as the teacher-linked results of all students in the state that complete the same

assessment. These assessment data may include Smarter Balanced scores if the graduate teaches mathematics in grades 3-8, New England Common Assessment Program (NECAP) if the graduate teaches science in grades 4, 8, or 11, and/or the mathematics section of the Scholastic Aptitude Test (SAT) if the graduate teaches grade 11 mathematics. Given the small sample size of the number of residents who will complete the residency program, the external evaluation team will wait until the final year of the grant to pool student achievement data.

LTO 2. The creation of a long-term, sustainable teacher residency requires coordination and collaboration between the teacher preparation institution and numerous other entities. In order to assess the level to which lasting partnerships have been established, the **Carsey School of Public Policy** will construct and analyze satisfaction surveys issued to key program participants at the **New Hampshire Department of Education**, NCES, and each participating LEA and schools at the conclusion of each year of the program. Overall trends as well as growth during the program will inform this line of inquiry. Documents which could support program sustainability will also be gathered, which may include new MOUs between partners, additional letters of support, joint grant proposals, or evidence of funds leveraged by LEAs that support grant activities. In addition, structured interviews will be conducted with key members of each partner organization at three times over the grant period (e.g., in years 1, 3, and 5 - a representative from NCES; in years 2, 4, and 5 - a representative from an LEA partner, etc.). These interviews will inform both formative and summative aspects of the evaluation.

Quantitative Data Analysis Plan

Descriptive Statistics. The **Carsey School of Public Policy** will examine measures of central tendency and variation for all quantitative data collected in during the evaluation. The performance of UNH resident graduates will be compared to other UNH teacher preparation

applicants, completers, and state averages, as far as data constraints allow. Yearly trends in all data will be examined, including an analysis of within- and between-cohort variation as appropriate. For those measures with an explicitly stated target benchmark (e.g. 95% of program completers will be hired into rural, high-need partner LEAs), comparisons to these established criteria will be made.

Methods that may Support Causal Inference. The primary difficulty in determining the effectiveness of UNH-TRRE is disentangling the effects of the program from the effects of contextual factors that also affect outcomes. For instance, UNH resident graduates could exhibit similar retention rates to traditional teacher preparation program graduates at UNH. However, given that residents likely teach in a much more challenging environment with a higher likelihood of turnover, it could be true that the program led to significantly higher rates of retention of residents than otherwise would have occurred in such an environment. Quasi Experimental Design (QED) will be explored in an effort to improve the validity of causal claims of effectiveness. These analyses will pool all relevant data over the entire duration of the UNH-TRRE in order to increase sample size and therefore statistical power to estimate the program's effect on select outcomes.

Propensity score matching will be explored to assess the impact of UNH-TRRE on the following measures: program persistence, teacher candidate satisfaction, certification, placement in a high-need school, and principal perceptions of performance. In these cases, applicant information for the UNH-TRRE program as well as the traditional teacher preparation program will be collected, including fields such as GPA, prior professional experience, and other demographic variables. From this, a logistic regression will use some or all of these covariates to estimate the likelihood of a candidate being selected into UNH-TRRE. UNH residents are then

compared to traditional teacher candidates with equivalent propensity scores. Through this methodology, we aim to assess the impact of UNH-TRRE with respect to the traditional program on the aforementioned measures. Considering the sustained excellence that has long been a part of traditional teacher preparation at UNH, this method uses a high standard of comparison.

In order to compare the retention of teachers in rural high-need schools, we likely must look beyond UNH graduates, as we do not anticipate a large enough sample of traditional teachers who work in high-need schools. In this case, we will gather retention data on other rural high-need novice teachers in the state with the help of the **New Hampshire Department of Education** and partner LEAs. Propensity score matching will be explored, although scaled Euclidean or Mahalanobis distance matching strategies may be preferred depending on the samples drawn. In the case where the data are insufficient to pursue these methods, the baseline retention data gathered will be used to make descriptive comparisons to the retention trends among UNH-TRRE graduates.

Ultimately, the success of any educational intervention relies on its ability to improve student achievement. We will assess the extent to which UNH residents outperform other teachers in the state with respect to their impact on student achievement results. Student-level achievement data from the **New Hampshire Department of Education**'s longitudinal database will be made available. Each student is linked to their classroom teachers, which allows for teacher value-added to student achievement to be estimated. One challenge in this instance, however, is that not all residents will teach subjects with end-of-year standardized assessments, let alone vertically-scaled assessments that allow for the construction of student growth percentiles or value-added models. In instances where TRs teach a subject with an end-of-year assessment, conditional models may be used to estimate teacher effects (Marion & Buckley,

2011; Hall, Gagnon, Marion, Schneider, & Thompson, 2014). Conditional models estimate teacher effects on student achievement with respect to other teachers from the same subject area—regardless of subject area or vertical alignment of assessments—by controlling for prior achievement in mathematics and English Language Arts, as well as student demographic variables such as gender, race, a measure of socioeconomic status, special education status, and English Language Learner status. Teacher effects will be converted to z-scores, which allows for comparison of teacher effects across subjects, grades, and years, to form a normed measure of teacher effectiveness. Although we cannot guarantee that an effect can be calculated for all residents, there are two reasons to suspect that sufficient samples may be generated. First, the small size of many rural New Hampshire schools means that many TRs will be responsible for multiple subject areas, increasing the chances that they teach a subject with an end-of-year standardized assessment. Second, pooling over the entire length of the program further increases the chances that a TR teaches a tested subject. The external evaluators will consult with experts with the Center for Assessment on statistical analyses.

External Evaluation Team.

Dr. Douglas Gagnon, Research Associate, Carsey School of Public Policy. As a research associate, Dr. Gagnon investigates a variety of education topics, including teacher quality, school staffing, and educational equity in education. His work on rural school and teacher quality has been featured in numerous peer-reviewed journals, with related articles solicited by *Kappan Magazine* and ASCD's *Educational Leadership*. In addition, he has presented in webinars on rural staffing strategies hosted by the US Department of Education's Midwest Regional Education Laboratory and Equitable Access Support Network. Dr. Gagnon has previously worked for the Delaware Department of Education through Harvard's Strategic Data Project,

where he helped manage a number of large project evaluations, including an external evaluation of the state's teacher evaluation system, DPAS-II. Prior to this, Dr. Gagnon contracted for the Center for Assessment on a review of state assessment practice. Dr. Gagnon has considerable experience in quantitative methods, including project-relevant techniques such as value-added modeling and survey design and validation.

Dr. Eleanor Jaffee, Evaluation Program Director, **Carsey School of Public Policy**: Dr. Jaffee has fifteen years of experience in applied research and program evaluation with nonprofit organizations, government agencies, and charitable foundations. In her six years at the Carsey School of Public Policy, her diverse project portfolio has included extensive work in New Hampshire's rural North Country. As a relevant example, she is the Project Manager and a Co-Investigator on the multidisciplinary Coös Youth Study, a longitudinal panel study set in New Hampshire's geographically isolated northernmost county exploring educational and occupational opportunities, health and well-being, and trends in outmigration among youth and young adults from the region. Prior to her current position, as a Research Associate in the Picker Engineering Program at Smith College in Northampton, Massachusetts, Dr. Jaffee headed a qualitative study of identity and career decision-making among women engineering students and students in other majors in response to recruitment and retention issues in the STEM fields.

References (See Appendix J).