

Priority 2: Emphasis on Science, Technology, Engineering and Mathematics (STEM)

New Hampshire has developed a comprehensive plan to increase achievement in and access to science, technology, engineering and mathematics education for priority schools and districts state-wide. The plan has been embedded throughout the application with this two-page section summarizing the primary STEM goals. Through this plan New Hampshire will guarantee all students will graduate from high school with the science, literacy and numeracy needs to persist in college and pursue a career in our highly scientific and technological workplace. To achieve this, the state will address the following goals:

- Increased access to high-quality STEM-related courses and experiences for all students in all schools, P-12, particularly for underrepresented groups and of women and girls; identify clear career paths in the STEM industries;
- Recruit, develop and retain effective teachers and principals thus guaranteeing an equitable distribution of highly qualified math and science teachers throughout the state, particularly in areas of high poverty and rural areas;
- Support all priority schools and districts to adopt and implement innovative research and standards-based models for STEM teaching; and
- Actively increase student preparedness for college-level math and reduce the need for remedial mathematics for high school graduates enrolling in college.

A. Increased access to STEM-related classes to all students in all schools, P-12, particularly underrepresented groups and of women and girls

Several overall strategies will be used to address the goal of increased access to high-quality STEM courses state-wide. Priority schools and districts will complete a multi-layered review of their existing STEM-related course offerings. This review will be used for a gap analysis that will guide the strategic plan for increasing access to courses. Related programs, such as robotics and science competitions, career and technical student organizations and work-related experiences will be evaluated as part of an overall strategy to generate student interest in STEM careers.

STEM courses are currently offered state-wide through the Virtual Learning Academy Charter School, and concurrent enrollment programs are offered in the same venue through e-Start. Continued development of virtual courses in STEM is a focus of the State's plan as well as the evaluation of access to all schools. Outcomes of initiatives will be measured with the student information system as well as the longitudinal data system. Data related to student enrollment and performance both at the secondary and postsecondary level will be analyzed to inform STEM coordinators on next steps.

New Hampshire is currently participating in the STEM Equity Pipeline project and is independently working with the National Association of Partners in Education (NAPE) to promote equity in all STEM contents. The NH e-Learning for Educators program is participating in this group and will develop one or more online courses, to be delivered through OPEN NH, on Issues in Equity in the STEM areas that teachers can use for professional development.

B. Recruit, develop and retain effective teachers and principals, and guarantee an equitable distribution of high quality mathematics and science teachers throughout the state, particularly in rural areas

The New Hampshire Department of Education will continue to partner with the University System of New Hampshire for pre-service teacher training in the STEM areas. Postsecondary teacher education programs will offer intensive STEM courses designed for P-12 teachers who need to strengthen their content knowledge.

Additionally, high quality professional development statewide will target mathematics and science teachers, particularly those in areas of high poverty and rural areas. This summer, Math-in-CTE, introduced to New Hampshire in 2008 will continue as a professional development model for mathematics and career and technical education teachers as it expands to a multi-state training in health sciences and pre-engineering programs.

STEM Professional Learning Communities will be implemented in the priority schools focusing on best practices, examination of data and related actions with data analysis and learning how to effectively target underrepresented groups for STEM related careers.

NHDOE is currently participating in the 10-state e-learning for Educators Initiative that offers online professional development courses in science, math and technology, providing teachers with opportunities to increase their knowledge in the STEM areas; these courses are offered through OPEN NH. Approximately 400 educators complete OPEN NH courses annually.

Federal funding has helped to develop, support and maintain the six regional professional development centers, collectively known as the Local Educational Support Center Network (LESCN). While these centers are not exclusively technology centers, their focus is to integrate technology into their professional development in order to increase teacher skills in technology use.

C. Support all priority schools and districts to adopt and implement innovative research and standards-based models for STEM teaching

The new state STEM coordinator will work with the Research and Development Office to facilitate partnerships and identify resources in regions around the state. This office will inform schools and districts as a result of their extensive research utilizing USDOE What Works Clearinghouse and the US DOE Research Centers. Curricula and teachers will be reviewed for effectiveness in STEM courses. A Curriculum Leadership Academy will be formed where teachers from priority schools and districts learn about standards-based models for STEM teaching. These teachers will explore innovative and research-based material and models and become leaders in the efforts to support teacher and program improvement statewide at other schools.

Again, through the participation of the federally funded grant with the STEM Equity Pipeline project, research based methods for promoting equity in teaching and learning is a major feature of this project.

D. Actively increase student preparedness for college-level math and reduce the need for remedial mathematics for high school graduates enrolling in college

Early in 2000, colleges around the country became increasingly aware of the high level of remedial math classes being offered to incoming freshman. In New Hampshire, between 2005 and 2007, 70 percent of incoming New Hampshire community college students were placed in developmental mathematics. Similarly, at the high school level, 68 percent of juniors scored below proficient on the state New England Common Assessment Program (NECAP) assessment. Responding to this crisis, two important events took place: the New Hampshire Department of Education adopted new graduation requirements that raised the math units from two to three, and the Community College System of New Hampshire partnered with Plymouth State University and select secondary schools to develop a proposal for Mathematics Science Partnership grant funds from the New Hampshire Department of Education. Although the increased math requirements is helpful, it remains possible that, due to block scheduling, students can complete these math requirements by the end of their sophomore year. The initial partnership resulted in a project entitled, “Making the Transition from High School to College” (MaTHSC) which proposed to research math under-preparedness among New Hampshire high school students and to synthesize research and literature on the transition from high school to college at the national level. Results of this research led to a Mathematics Steering Committee that effectively coordinated agreement on mathematics assessment scores for college freshmen enrollment and the development of a common threshold mathematics course. The project uses ACCUPLACER as an advising tool for high school juniors and as a pre- and post-test for the newly developed dual-credit Senior Mathematics course (TAC.Math). This was successfully piloted at six high schools in 2008-2009 with promising results. Pre- and post-test scores on ACCUPLACER showed dramatic improvement. Interest and enrollments in Senior Math (TAC.Math) at the initial pilot schools exceeded expectations. Further implementation will offer this course in additional schools, including priority high schools during 2010-2011, while also expanding related professional development for teachers in each of the participating schools.

Priority 4: Expansion and Adaptation of Statewide Longitudinal Data Systems

The NHDOE is developing its Statewide Longitudinal Data System to fully meet its needs and also to benefit other state education agencies and school districts across the country. NH plans to release the longitudinal data warehouse data model into the public domain.

New Hampshire's implementation of the education data warehouse aligns with standards developed by the National Center for Educational Statistics (NCES) and is closely aligned to the NCES Handbooks. The open data model has been developed using broadly accepted dimensional modeling techniques. The public domain model supports vertical alignment between state and local education agencies, and structures to capture student learning longitudinally from early childhood through adult.

The data warehouse is fed by a publicly available student data collection, along with a new Educator Information System and other proprietary source systems. The model was developed with P-20 in mind and will be further developed to support early childhood through workforce. The data warehouse also feeds Performance Plus, a system used by LEA educators to inform instruction.

A key to NH's success has been strong collaborations throughout our state. The NHDOE has been a leading player facilitating work of a Governor's P-16 Council (which includes workforce development). Building on the P-16 goals and the ARRA goals, our objective is to develop a system that ties together Early Childhood Programs with Kindergarten through 12th Grade, Institutes of Higher Education and workforce data. By doing so, an expanded longitudinal system will assist us in achieving numerous objectives:

1. Allow districts, schools and postsecondary institutions to review and evaluate existing programs and initiatives and identify the need for new ones.
2. Fulfill accountability obligations in an accurate and timely manner.
3. Identify key indicators of college readiness.
4. Provide market intelligence for public higher education institutions.
5. Determine what teacher-related factors lead to improved student outcomes.

6. Ease the strain of student mobility by speeding access to student data.
7. Provide relevant and timely student data to help inform programmatic interventions.
8. Determine the root causes underlying performance issues and provide feedback to drive and evaluate reform initiatives.
9. Assess students' "Success in Life" beyond the education system by obtaining feedback from alumni and employers.
10. Inform higher education admissions standards.
11. Facilitate application processes by implementing electronic student record transfer.
12. Acquire data required to develop a teacher and principal evaluation system that will use student performance as a metric for that evaluation system.
13. Provide early learning data to inform and evaluate programming from the pre-K and kindergarten years through the post-secondary and workforce time periods.

The University System of New Hampshire, the Community College System of NH and several private institutions of higher education have agreed to share data with the NH DOE. DHHS will provide individual early childhood data including program participation, entry, exit and type of program and participant demographics. Postsecondary data from the University System of New Hampshire, the NH Community College System and two private colleges in NH will include student level data on remedial education courses taken, entry, withdrawal and transfers, and degrees and certificates granted. Workforce data will focus on teacher education data including the number of graduates from teacher preparation programs, certification received by students in each program and the number of students employed as a teacher in NH within their first year of graduation. We will work to connect student data for students who pursue teaching positions in NH.

Plans are also in place to expand the data warehouse to include the following:

- Teacher preparation, certification and portfolio data. The NH SLDS currently contains a limited set of data related to teacher preparation and certification. With the increased federal emphasis on equitable distribution of teachers, we must ensure we have the right metrics to understand the distribution and the effectiveness of educators. Therefore, as part of this effort, we must also ensure we are collecting the right data.

- Financial data. Financial data will provide the ability to evaluate the linkage between programs and funding.
- Teacher-evaluated academic and non-academic assessment data into the data warehouse. NH has incorporated multiple assessments in the Performance Plus tool to inform instruction. To compliment the student assessments, teacher-evaluated academic and non-academic assessment data (e.g., perception data – social, personal and physical skills) should also be available. We plan to create and include student surveys and/or teacher rubrics that will allow for summary of student success and needs that are identified by the teacher or student without the use of an assessment test. This concept has been rolled out for career and technical education competencies, but we would like to pilot this concept for multiple areas: school climate; high school competency completion; extended learning opportunities.
- High school assessment data such as SAT, ACT, AP, PSAT assessment scores. NH has implemented a warehouse with multiple assessments in K-8. Although, the ability to analyze multiple assessments has been beneficial to schools, we need to expand the warehouse to include multiple assessments in 9-12. We also plan to integrate this data into Performance Plus and work with high schools to inform instruction using this new data.
- Student performance data in the Arts. In an effort to better evaluate student access to the arts (dance, music, theatre and visual arts) the NHDOE implemented a school-by-school data collection project for the 2008-2009 school year. It is the intent of the NH DOE to build student performance data in the arts, into the data warehouse. With this data we will be able to examine student performance in non-tested areas and the contributions of a student's full curriculum in relation to his/her preparedness for college and career. Performance measures will be based on a set of state developed standards-based common performance indicators (competencies). The model developed will be used for further expansion to include other non-tested subjects and to include elementary and middle school levels.

NH DOE is working in collaboration with the NH Department of Health and Human Services, and the NH Court System. These state agencies are collecting data on children who are court

order placed. Many of these students have been in the public school system so they do have a unique, state assigned student ID number (SASID). Once the student leaves the public school system and enters a court ordered facility the continuity of the student data is lost. DCYF and DJJS collect educational data and maintain it in separate systems. They also do not have access to the public school system data. Our plan is to create an inventory of data collected to begin the process of identifying data requirements and redundancies. Once the inventory is completed we can address data that can be stored in the data warehouse and shared across agencies to maintain a complete educational record for the student.

New Hampshire has been a national leader in reducing the drop-out rate for students in high school. Recently the state increased the compulsory attendance to age 18 for a student who would like to drop-out. Additionally, the primary stakeholders (governor, commissioner of education, etc) are committed to reducing the drop-out rate to zero percent. The state plans to create an early-warning system to identify potential dropouts through the use of data. By identifying key indicators (e.g. attendance, assessment results, etc.), a system will be identified to highlight students who are at risk. Data will be considered starting early in a student's education – e.g. elementary school. Additionally, this system will use real-time transfer data to ensure students transferring schools arrive in a timely manner – or if not, notification is made immediately to reach out to the student.

New Hampshire has also been recognized for its ability to collect critical assessment, student demographic and program data and to enable educators in schools across the state to leverage this data to improve instruction. This use has helped and will help groups of students and individual students as educators analyze instruction at the macro and individual level. Educators within the schools have been able to embrace data to inform instruction, however additional research using rigorous research methods can complement this use of data to help identify what programs are working, which are not and can help define the creation of new programs. NH plans to launch a series of research efforts to inform state policy and local school operations. NH has already brought together a team of researchers to identify the top NH priorities for this research. The research will include such areas as: identifying and determining support needs for high school juniors and seniors who have the ability to advance to college but are not moving

forward with the application process, or analyzing the connection between teacher preparation programs and assessment results. Another possible research effort will consider the correlation between the state common assessment (NECAP) and a national adaptive assessment (NWEA) that is used by almost 50% of our schools and is aligned to our state assessment. A similar effort can compare the NECAP state assessment with the SAT.

NHDOE applied for ARRA SLDS funding to assist in the implementation of these efforts. With additional funding we will have the ability to implement our goals in a shorter time frame. Without the ARRA SLDS funding we will move forward, however, with limited capacity implementation will be at a significantly slower pace.

Priority 5: P-20 Coordination, Vertical and Horizontal Alignment *(not scored)*

The Secretary is particularly interested in applications in which the State plans to address how early childhood programs, K-12 schools, postsecondary institutions, workforce development organizations, and other State agencies and community partners (*e.g.*, child welfare, juvenile justice, and criminal justice agencies) will coordinate to improve all parts of the education system and create a more seamless preschool-through-graduate school (P-20) route for students. Vertical alignment across P-20 is particularly critical at each point where a transition occurs (*e.g.*, between early childhood and K-12, or between K-12 and postsecondary/careers) to ensure that students exiting one level are prepared for success, without remediation, in the next. Horizontal alignment, that is, coordination of services across schools, State agencies, and community partners, is also important in ensuring that high-need students (as defined in this notice) have access to the broad array of opportunities and services they need and that are beyond the capacity of a school itself to provide.

The State is invited to provide a discussion of this priority in the text box below, but such description is optional. Any supporting evidence the State believes will be helpful must be described and, where relevant, included in the Appendix. For attachments included in the Appendix, note in the narrative the location where the attachments can be found.

Recommended maximum response length, if any: Two pages

The NH P-16 Council was established August, 2007 via proclamation by Governor John Lynch to create a system of education for all NH students that begins in early childhood, ends after college

and promotes access, standards, accountability and lifelong learning. The intent of the Council was to develop an integrated and seamless system that will provide context and direction for reform efforts. The NH P-16 Council was charged with bringing cohesion and alignment across various initiatives effecting P-16 systems. The ultimate goal of NH's P-16 system is to improve student achievement by getting children off to a good start, raising academic standards, conducting appropriate assessments, improving teacher quality and generally smoothing student transitions from one level of learning to the next. Members have labeled this a "seamless" system to underscore the need to recognize the interdependency and common goals among preschool, elementary, secondary and postsecondary education.

The NH P-16 Council is very active today. Membership includes:

- Office of the Governor Education Liaison Christen Lavers
- Commissioner of Education Virginia Barry
- University System of New Hampshire Chancellor Ed MacKay
- Community College System of New Hampshire Chancellor Richard Gustafson
- Executive Director of the College and University Council Thomas Horgan
- Workforce Representative Michael Powers
- Executive Director of the NH Postsecondary Commission, Kathryn Dodge (Chairperson)
- Regional General Manager of Fidelity, Allison Stebbins (Business Rep)
- Jackie Crowell, Childcare Advisory Council

The Council has taken on some significant work over the last three years, including:

Tier I:

- ◆ Follow The Child model – using the Follow The Child model, which tracks student data on a number of variables, pilot test, with two self-selected high schools, a program requiring all graduating seniors to complete at least one college application. Pilot *Universal College Application*.
- ◆ Align NHDOE SASID (student data sharing system) P-16 – student progress and attainment to

be tracked from HS through postsecondary using non-personal identification number providing quantifiable data for outcome measures including learning outcomes, program evaluation, access, retention and graduation rates, as a first step toward identifying elements and practices that support those HS–college transitions and diminishing barriers that prevent students from pursuing postsecondary learning.

Tier II:

- ◆ Setting Goals system-wide and working concertedly and collaboratively to achieve them. First example: Reducing NH dropouts to zero, by creating multiple pathways to graduation from high school and engagement in college, based on student performance, not on seat time.
- ◆ Dual enrollment programs – create at least two demonstration programs whereby qualified and recommended high school seniors can enroll in USNH or NHCTCS courses (on campus or online) and receive academic credit.
- ◆ HS – Higher Ed aligned standards – the P-16 working group will establish aligned high school exit standards and college entrance standards as a first step toward seamless P-16 transitions.
- ◆ Support for learning, increase retention P-16 – Examine cross-cutting supports of teacher preparation programs and in-service professional development for teachers, including technology and strategies for sharing academic performance data across systems to support student learning opportunities.

Meetings

Meetings are held quarterly each year. Each meeting includes a business meeting component along with a presentation by a member of the education community and discussion to keep the committee aware of current issues and trends.

Agendas are determined by the membership and the overall plan. Other professionals with expertise

relating to agenda items may be invited to council meetings.

Next Up On Agenda

- Recruiting the Commissioner of Department of Health and Human Services, Nick Toumpas, as a regular member in order to pull in “systems of care” such as Early Learning Programs, Juvenile Justice, Child and Family Services, Mental Health Services and Substance Abuse Prevention into the equation around eliminating dropouts and engaging a larger proportion of students in their education;
- Implement an Early Warning System, not just for dropouts, but for success in College, for students Pre-K through 16, (to be funded initially by a National Governors Association (NGA) grant for dropout prevention, beginning January, 2010.
- Lead and Participate in the Adoption of Common Core English Language Arts and Mathematics by August, 2010, by engaging high school teachers in the two content areas with college instructors with entry courses in the University, Community Colleges, and Private Institutions of Higher Education.
- Adoption and implementation of New England Secondary School Consortium Goals for system improvement.

GOAL	To ensure that every public high school student graduates prepared for success in the colleges, careers, and communities of the 21st century, and that their educational performance and attainment is competitive with their peers worldwide.						
OBJECTIVES	1. Graduation Rates Increase four-year, on-time graduation rates across the four states to ninety percent or higher.	2. Drop-out Rates Decrease annual drop-out rates to less than one percent.	3. College Enrollment Increase the percentage of students enrolling in two- or four-year college-degree programs to at least eighty percent.	4. College Preparation Reduce the number of students required to take remedial courses during their first year of college to five percent or less.	5. College Success Partner with colleagues from higher education to ensure that more students enroll in and complete a postsecondary degree.		
BARRIERS	Persistent inequities in schools and a decline in economic opportunity across the region.		Shifting educational needs in the 21 st century and low student attainment of relevant skills, knowledge, and habits of mind.		Insufficient cultural understanding and political will needed to accept and embrace a new vision of public education.		Inadequate capacity at the state, district, and local levels for transformative innovations in secondary education.
ACTIONS	Initiate a movement Build broad-based support for the Consortium's major initiatives among educators, policy makers, and business leaders, while engaging parents and community members in the educational process.	Co-adopt 21st-century learning standards Develop and co-adopt a set of integrated, forward-thinking learning standards that reflect the ways in which our youth will live, work, learn, and lead in the 21st-century.	Reshape educational policy Conduct an extensive review of the policies governing secondary education and develop new state and local policies designed to stimulate educational innovation.	Accurately measure student learning Explore, promote, and implement the use of performance assessments and standards-based grading practices that more accurately measure student learning.	Ensure international competitiveness Undertake a wide-ranging international-benchmarking effort and apply the characteristics of effective 21 st -century education to the creation of new models of teaching, learning, and leading.	Create versatile learning models Work with educators to develop innovative and internationally competitive learning models at the secondary level, beginning with the transformation of a core group of high schools in each of the four partner states.	Build collaborative networks Create in-state and cross-state networks comprising state agencies, support organizations, postsecondary institutions, districts, and schools that can share resources, in pursuit of the Consortium's common mission.

Expected Outcomes by 2010

- Increased proficiency scores on NECAP in P-12 for each individual student
- Decreased high school drop-out rate
- Increased college attendance and completion, by percent at both the two-year and four-year institutions
- Better prepared graduates to enter the workforce as reported by exit assessment and alumni and employer satisfaction surveys