

GOVERNOR'S TASK FORCE ON STEM EDUCATION K-12

DRAFT PLAN FOR DECEMBER 2015-JUNE 30, 2016

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INSPIRING STUDENTS

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CHARGE: Develop and act upon implementation plans to address the following recommendations from the Task Force Report to the Governor, January 2015.

Recommendation 3. STEM-Inspirations: Challenges, Competitions and Capstones.

Applied STEM learning opportunities, including competitions, should be expanded and incorporated into the curriculum. Age-appropriate STEM-Inspiration sequencing could begin with thematic, problem- and project-based STEM topics in early grades, then move to collaborative, team-based, district-wide STEM competitions in middle school (using FIRST®¹ as a base model program). Finally, students in their junior or senior years of high school should be encouraged to complete a capstone project requiring problem-based research and presentation of results for peer and evaluator review. This applied learning sequence aligns with the NGSS.

BACKGROUND

Bringing challenges, competitions and capstones to all NH school districts will be a challenge with limited funding and a desire to encourage rather than mandate programs/activities in NH school districts. The notion of “challenges” for elementary school students is not one that has been pursued before in NH (or in other states as well). In terms of capstones, some school districts have classes that provide opportunities for select students to perform independent studies that are similar to the capstone envisioned by the TF. However, these are limited both in size and scope. There are, however, a multitude of STEM-related competitions that already have participation from some NH school districts. The NH Charitable Foundation has already gathered information on STEM-related activities and programs throughout the state of NH.

GOAL

Identify, analyze and select a few STEM competitions that the Task Force could promote to school districts and support in some way (either by recruiting businesses to support the effort or finding ways to assist in incentivizing school districts to join).

NEXT STEPS

- Starting with the Charitable Foundation database, survey each district to determine what other STEM-related activities, clubs, competitions, etc. are being supported throughout the state.

¹ FIRST® (For Inspiration and Recognition of Science and Technology) is a 501(c) (3) non-profit that designs a variety of programs to motivate young people to pursue a STEM education and career opportunities.

- Develop clear definition for what the TF believes would qualify as a challenge, competition and capstone
- Categorize all the events in the database to see if they already meet the challenge, competitions, or capstone criteria, or if they could form the basis for one of those themes.
- Select 2 or 3 competitions either from the existing list (preferred), or from known nationwide competitions on which the Task Force will focus.
- For each selected competition identify what the primary needs are for the competition. Does equipment need to be purchased? Transportation to/from events? Judges/volunteer help?

DELIVERABLES:

A list of example programs for challenges and capstones culled from the NH database.

Identify the selected competitions, declare them to be “Task Force” approved and concentrate on building those competitions within the state by promoting the efforts to districts, encouraging businesses to provide support for school teams, providing logistics and funding to support the infrastructure needed to manage and run these competitions.

Recommendation 4a. Early College Academies for STEM: Motivating Advanced Studies – New Hampshire Math and Science Academy

Establish STEM advanced studies leading to a high school diploma and one or two-years of college credit through combination of classroom, research and career experience. The Early College academies would offer two new pathways for New Hampshire students to fulfill their STEM aspirations. The New Hampshire Math and Science Academy (NHMSA) would provide juniors and seniors in high school, who are highly interested in a STEM education, a residential experience allowing them to focus more broadly and deeply in STEM subjects. The NHMSA is designed to prepare students for success in rigorous undergraduate STEM degree programs and high-skill STEM careers.

GOAL

Draft a feasibility study for establishing a public, residential STEM-intensive school known as the New Hampshire Math and Science Academy (NHMSA). The NHMSA will serve NH 11th and 12th grade students, NH STEM teachers interested in professional development and NH 6th - 9th grade students interested in summer STEM programming.

NEXT STEPS

The feasibility study will include:

- A review of other public, state-specific, residential STEM-intensive schools for 11th and 12th grade students
- A proposed mission statement for NHMSA, including a sense of how NHMSA is unique to NH.

- A list of objectives of the NHMSA, including objectives that will impact New Hampshire students, teachers, families, businesses, and the economy.
- A statement on the significance and rationale for establishing NHMSA that could be useful in rallying support among NH citizens as well as individuals in NH government, education, and businesses.
- Proposed model for student selection and criteria for admittance into NHMSA
- Proposed location(s) (if possible) for NHMSA, including the benefits and shortcomings of proposed location(s).
- Prospective model for governing NHMSA.
- Prospective sources of funding for NHMSA including government, NH businesses, private donors, local schools, and families of students who attend NHMSA.
- Letters of support from early supporters for the establishment of NHMSA including supporters from the NH legislature, Department of Education, NH businesses, and NH citizens.
- Recommended first steps upon receipt and review of the feasibility study

MILESTONES

- Share working draft with NH STEM Task Force members for feedback by May 1, 2016
- Share working draft with appropriate readers outside of the NH STEM TF for feedback by June 1. Appropriate readers may include key members of the DOE, legislature, university system, and business community).

DELIVERABLE

Submit final draft to the Governor by June 30.

Recommendation 4b. Early College Academies for STEM: Motivating Advanced Studies – New Hampshire Career and Technical Education

The New Hampshire Career and Technical Education Schools – affiliated with the NHMSA and in partnership with NH Career and Technical Education (CTE) programs – would provide interested sophomores, juniors and seniors the opportunity to pursue advanced and accelerated application of real-world STEM disciplines and the integration of academics with work and career preparation. The academies would prepare students for employment, provide opportunities for post-secondary credential and certificate attainment, and act as accelerated pathways to advanced education in applied fields.

BACKGROUND

Currently there are a variety of opportunities for high school students to participate in dual credit programs through institutions including the CCSNH Project Running Start program and with SNHU. Some early college STEM pathways have been developed in CTE centers where as many as 12 college credits can be acquired within CTE programs. These efforts have been brokered by individual schools with no state-wide coordination between CTE and CCSNH. Career pathways within STEM areas should be developed with seamless transition from secondary to 2 year to 4

year degree programs (2+2+2) with state-wide coordination between all systems. While relationships exist between secondary and the CCSNH and between CCSNH and USNH, there should be seamless credit transfer and program alignment between all levels. In addition, the business community must be an integral partner at all levels to ensure skilled labor and economic vitality for the state. This partnership should involve programmatic and curricular guidance as well as internship, apprenticeship and work opportunities.

GOALS

- Create early college STEM pathways that connect secondary CTE, community college, and workforce opportunities.
- Develop state-wide advisory boards in key STEM areas such as IT, engineering, advanced manufacturing and healthcare to provide guidance to secondary and post-secondary education for the design and implementation of viable and relevant curriculum as well as providing insight into market and labor demand and programmatic needs.
- Establish strong communication between secondary CTE, CCSNH and USNH so that each level understands the quality and rigor of STEM education delivered and can work toward seamless transitions and acceptance of credits earned at each level.

NEXT STEPS/MILESTONES

Continue to refine the focus and priorities for early college models and pathways

Recommendation 5. STEM Career Pathways: Charting Personal Learning Plans

School districts emphasizing STEM competencies can support the development of Personal Learning Plans (PLP), starting in the 7th grade. Personal planning would include interest inventories, career exploration, course advising and job shadowing experiences reflected in a written plan. Students would update their plans each year from the 9th through 11th grades. PLPs can help students make connections between their emerging STEM career ambitions and high school STEM and CTE studies. PLPs would also help all students and their parents understand the relationships of STEM literacy to a student's potential career goals

GOALS:

- Provide guidance to the NH Department of Education, policymakers and school districts on design and implementation of best practices to expose students to career options based on their interests. This includes integration of career interests and planning into Career and Technical Education and academic planning to begin in 7th grade and continue throughout high school.

- Investigate impact of pathways planning on students' (a) motivation and engagement in school, (b) understanding of post-secondary and long-term career options, (c) course selection to support career goals.
- Assess feasibility of designing and implementing a pilot program to test Career Pathways Planning as basis for adaptable models that can eventually be brought to scale in local school districts in NH
- Create a centralized resource on career pathways for local school districts, parents and students working with statewide and national partners; connect pathways planning to other STEM initiatives with state and federal career awareness and workforce development.

NEXT STEPS/MILESTONES

- Advisory Group: create an advisory group with educators, parents and students to provide insight into what students want and need relative to career planning starting in middle school years; review research and best practices for Career Pathways Planning and user experience with planning tools. Milestone: end of January, 2016, for initial group formation.
- National and NH Research: Scan national literature/websites and conduct interviews with leading experts; talk with school leaders who are implementing career pathways and learning plans to discover what is working and what is not. This will include gathering outcomes-based research, collecting best practices, lessons learned, challenges overcome, and design and implementation options (including resources needed, articulation of roles for teachers, parents, counselors and others, and local adaptation for schools and districts). Milestone: March, 2016.
- Guidance document: Prepare guidance document based on research for use by NH Department of Education and school districts. Milestone: June 2016.
- Pilot program discussions: Depending on outcomes of research, aim to implement a pilot program in 2016-2017 school year to test out design and implementation of career pathways/learning plans under controlled (observed and documented conditions). Note: our assumption is successful career pathways/learning plans are being implemented in some NH schools, but we lack sufficient research data to understand key factors for successful, highly implementable programs geared to local conditions. Milestone: Discussions by March, 2016; pilot launch 2016-2017.

DELIVERABLES:

June 2016 guidance document and report on pilot program status.

Recommendation 6. Girls in STEM: Engaging and Mentoring Girls for STEM Careers

There is broad commitment manifested through activities to support girls in STEM education. These activities, however, are often not coordinated and therefore do not build as much momentum as is required. A governor-appointed advisory council would lead a collaborative effort to attract and support girls in K-12 to discover, explore and pursue STEM-related careers. The council would also track and report on program outcomes, provide mentors, and provide guidance in the development of Personal Learning Plans.

GOALS

Draft a plan to build statewide cohesiveness, collaboration and dissemination of knowledge to support girls in STEM beginning in early childhood through college and workforce years.

Support efforts by organizations such as the NH High Tech Council Women/Girls in STEM Ambassadors program, and search out other similar programs for statewide collaboration

NEXT STEPS

- Develop a statewide leadership team composed of key leaders and organizations promoting girls/women in STEM (including the voice of P-12 girls and women at multiple pathway points).
- Study and report on the landscape of girls in STEM in New Hampshire by collecting and disseminating critical participation and achievement data.
- Connect stakeholders working to achieve common goals to broaden and cohesive resources.