MARYLAND BUSINESS ROUNDTABLE FOR EDUCATION

TO: Members of the State Board of Education

FROM: June E. Streckfus

DATE: August 27, 2013

SUBJECT: STEMnet – Maryland's Science, Technology, Engineering and Mathematics Innovation Network

PURPOSE:

The purpose of this agenda item is to provide information about STEMnet and its programs aimed at accelerating student growth, teacher growth and building public support in STEM.

BACKGROUND:

The Maryland Business Roundtable for Education

The Maryland Business Roundtable for Education (MBRT) is a nonprofit coalition of leading employers that have made a long-term commitment to improve education and student achievement in Maryland. MBRT has a 20-year history of pushing for achievement of high standards; demanding a system of education that prepares all students for the rigor of college and the workplace; demonstrating the fundamental relationship between performance in school and success in the workplace; and challenging and motivating students to perform at high levels.

Maryland's STEM Innovation Network - STEMnet

In 2008, Governor Martin O'Malley charged a broad-based community of Maryland's education, business and policy leaders to produce a blueprint for action that would position Maryland as a global leader in the development of its workforce and its STEM-based research and economic development infrastructure. In response, the Governor's STEM Task Force proposed a plan comprised of seven recommendations that address Maryland's entire STEM system: student preparation for participation in a knowledge-based economy, the training and support of STEM teachers, the development of in-state STEM entrepreneurs, and the expansion of Maryland's internationally recognized research and development capabilities. The plan – "Investing in STEM to Secure Maryland's Future" -- was accepted and approved by the Governor in August, 2009.

The seventh recommendation proposed an unprecedented mechanism for coordination, resource dissemination, and idea sharing among all of Maryland's STEM stakeholders—P-12 teachers, students, parents, higher education faculty, business and community leaders, economic development officers, researchers, and policymakers. It called for the creation of a physical and virtual network that would be available to all stakeholders for the purpose of

developing and implementing a sustainable STEM education-workforce-research-economic development strategy for the state.

In early 2010 at the request of Governor O'Malley, MBRT took the lead in planning and developing Maryland's STEM Innovation Network – STEMnet. With generous funding and technical support from AT&T, Citi, Northrop Grumman, and IBM, the initial hub of STEMnet – known as STEMnet Teacher Hub – was developed. In early fall 2010, additional funding for the development of STEMnet was secured when MSDE received one of the federal government's coveted Race to the Top (RTTT) Grants; funding for the initial stages of two STEMnet hubs – a Teacher Hub and a Student Hub – was included in Maryland's proposal.

Through surveys, focus groups, interviews, and summer teams, 1,000 STEM teachers in Maryland participated in the development of the STEMnet Teacher Hub, and hundreds of employees from committed Maryland employers – like Johns Hopkins, Northrop Grumman, Battelle, NSA, NASA, NIH, T. Rowe Price, University of Maryland Medical System – are volunteering to co-teach with teachers in classroom to strengthen student understanding of math and science concepts, how they are used in the workplace, and to motivate students to pursue STEM courses and careers.

To date, over three years of the RTTT funding period, MBRT has designed, developed, and tested five components of the STEMnet that will serve both teachers and students:

Teacher Hub	Student Hub
STEM Specialists in the Classroom	STEM Career Exploration
STEM Resource Clearinghouse	STEM Challenges
STEM Connections (to be developed in 2014)	STEM Workforce Exposure Opportunities

(See attached for more detail.)

All five components will be launched in 48 high schools in all 24 school districts during the 2013-14 school year. These schools will be designated at STEM Innovation Schools. Thanks to a $300,000 investment by the Governor, supported by Dr. Lowery, MBRT was able to accelerate expansion from 24 to 48 schools.

EXECUTIVE SUMMARY:

In 2010, at the Governor's request, the Maryland Business Roundtable for Education (MBRT) took the lead in planning and developing STEMnet – Maryland's Science, Technology, Engineering and Mathematics Innovation Network. With the support of Senator Mikulski and in partnership with the Maryland State Department of Education, local school districts, and STEM teachers across the state, STEMnet will provide a platform that will ensure universal access to Maryland's vast STEM resources.

ACTION:

No action required, for discussion only.

Attachments:
- Moving Maryland to World-Class in STEM
- STEMnet Hubs

Moving Maryland to World-class in STEM (2013-2018)

MARYLAND STATE DEPARTMENT OF EDUCATION — Preparing World-Class Students

MARYLAND BUSINESS ROUNDTABLE FOR EDUCATION

MARYLAND — OFFICE OF THE GOVERNOR

Problem
Lagging student performance in STEM

Solution
Impact 500,000 STEM teachers, students and parents in 5 years

Outcome
Improved student performance in STEM as measured by standardized instruments

Goals	Outcomes	Programs

Accelerate Teacher Growth

Outcomes
- Participating teachers are confident and evaluated as effective in teaching new math Common Core Curriculum and Next Generation Science Standards
- Participating teachers are satisfied with the quality and quantity of STEM tools, resources and technical support available to them

Teacher Support
- *STEM Specialists in the Classroom* – at-elbow instructional support from workplace specialists with on-the-job expertise in specific math and science concepts and practices
- *STEM Resource Clearinghouse* – a single online destination to find STEM resources to strengthen classroom instruction and improve student learning
- *STEM Connect* – access to STEM educators and professionals in industry, higher education, and government to obtain/share information and collaborate on projects

Accelerate Student Growth

Outcomes
- Participating students demonstrate understanding of math/science concepts
- Participating students understand the value and importance of math/science to their careers and lives
- Participating students pursue additional STEM coursework and careers
- Participating students demonstrate an awareness of workplace expectations

Student Support
- *STEM Career Exploration* – an opportunity to explore a wide variety of STEM careers and what it takes to qualify for them
- *STEM Challenge Program* – an opportunity to solve real STEM problems experienced by (and posed by) real-world industry specialists
- *STEM Workplace Exposure* – an opportunity to obtain workplace exposure in the form of internships and job shadowing
- *Maryland Scholars Speakers Bureau* – provides speakers to 8th and 9th grade classes to motivate and inspire students to complete rigorous STEM coursework

Build Public Support

Outcomes
- Participating organizations are aligned to State STEM goals
- Participating parents are accessing, utilizing electronic STEM information and finding it to be of value

Public Support
- *Public / Private STEM Collaborative* – a broad-based MD network to create a strong culture supporting STEM
- *Parents Count* – a monthly electronic message giving parents the information, tools, strategies, and connections to support their efforts in guiding their children from elementary through middle school, high school and college and into rewarding careers

---

powered by STEMnet

Powered by the STEM Innovation Network (STEMnet)
- a transformational online platform that provides universal access and connection to MD's vast STEM resources and opportunities led by the Maryland Business Roundtable for Education   stem@mbrt.org

Teacher Hub

MBRT is building what STEM teachers say they need —
an online system that connects them to people and resources that will:
- bolster student learning and interest in science and math
- demonstrate real-world application of math and science concepts/skills
- facilitate greater interaction/collaboration among STEM teachers and practitioners.

STEM Specialists in the Classroom	Offers teachers at-elbow instructional support from workplace specialists with on-the-job expertise in specific mathematics and science concepts and practices. Using an "e-Harmony"-type online system containing profiles of trained workplace specialists and their areas of expertise, teachers invite/schedule specialists to "co-teach" a lesson in their classroom, aligned to standards/curriculum, providing students with the opportunity to experience real-world application of their learning. 2011-12 – Piloted in Baltimore County, biology focus 2012-13 – Expanded to 6 districts, algebra and biology focus 2013-14 – Launch in 24 districts, chemistry and physics added
STEM Resource Clearinghouse	Offers teachers a single online destination where they can find STEM resources to strengthen classroom instruction and improve student learning. Using an "app store"-type format, teachers can easily locate and download curriculum materials, lesson plans, demonstration videos, classroom experiments, enrichment activities, and teaching aids that are mapped and meta-tagged to Common Core Standards and Maryland Core Learning Goals. 2012-13 – Initial phase launched, focus on algebra and biology 2013-14 – Chemistry and physics resources added
STEM Connections	Offers teachers access to STEM educators and professionals in industry, higher education, and government to obtain/share information and collaborate on projects. As part of an online STEM community, teachers can connect with other STEM teachers and professionals in the field to pose questions, share effective practices/resources, work together to solve problems, and learn about professional development or externship opportunities. 2013-14 – Initial phase launched

STEMnet – Maryland's STEM Innovation Network – is being created by MBRT in response to the Governor's STEM Task Force Report, to provide a platform that ensures universal access to Maryland's vast STEM resources. In partnership with the Maryland State Department of Education, local school districts, and STEM teachers across the state – and with funding from Race To The Top, the State of Maryland and private corporations – the Teacher Hub is being created by MBRT to support STEM teachers and their efforts to move Maryland to world-class status in STEM education.

Student Hub

MBRT is building what students say they want –

an online system that connects them to information, resources and opportunities that will:

- make science and math instruction come to life
- provide opportunities to learn about STEM careers
- challenge their thinking and reward outstanding achievement

STEM Career Exploration	Offers students an opportunity to explore a wide variety of STEM careers and what it takes to qualify for them. Using an interactive teen-oriented website, students can browse through a variety of well-paying, high-demand career fields, get in-depth information about the ones that interest them, and construct a plan to set and achieve their career goals – and to become part of an online community of STEM-interested students. 2011-12 – Initial phase developed, biology-related fields 2012-13 – Expanded to include algebra-related fields 2013-14 – Expanded to more STEM fields
STEM Challenge Program	Offers students, in class or on their own, the opportunity to solve real STEM problems experienced by (and posed by) real-world STEM specialists. Students will be introduced to real-world challenges by an expert in the field and are invited to develop solutions, allowing them to become part of a community of problem-solvers and to receive feedback and recognition for their contributions to the solutions. 2012-13 – Initial phase launched, focus on algebra and biology 2013-14 – Chemistry and physics challenges added
STEM Workplace Exposure Opportunities	Offers students the opportunity to obtain workplace exposure in the form of internships and job shadowing. Using an online inventory of workplace exposure opportunities, students can locate and apply for positions that will allow them to experience work in a career field of their choosing. This program will give all students a more level playing field to compete for existing opportunities. 2013-14 – Initial phase launched

STEMnet – Maryland's STEM Innovation Network – is being created by MBRT in response to the Governor's STEM Task Force Report, to provide a platform that ensures universal access to Maryland's vast STEM resources. In partnership with the Maryland State Department of Education, local school districts, and STEM teachers across the state – and with funding from Race To The Top, the State of Maryland and private corporations – the Student Hub is being created by MBRT to support STEM teachers and their efforts to move Maryland to world-class status in STEM education.

Maryland Business Roundtable for Education
5520 Research Park Drive, Suite 150, Baltimore, MD 21228

www.mbrt.org