



FUNDING GOVERNOR’S SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM) ACADEMIES AND GOVERNOR’S HEALTH SCIENCES ACADEMIES

SUMMARY

School divisions in Virginia need more than a leap of faith and a small one-time incentive budget to start and sustain Governor’s Science, Technology, Engineering, and Mathematics (STEM) Academies and/or Governor’s Health Sciences Academies. The Commonwealth of Virginia currently has 23 Governor’s STEM Academies and nine Governor’s Health Sciences Academies. These Governor’s Academies require a substantial investment of time and funding from local school boards and school division leadership. As a model Governor’s Academy, they combine core academic coursework with Career and Technical Education skill sets, credentials, industry partners, and career pathways to fill critical workforce demands. Both STEM and Health Sciences sectors require higher-level mathematics, sciences, communication skills, teamwork skills, and a career preparation focus. The economic future of the Commonwealth rests on our ability to prepare students for successful entry into the workforce and postsecondary education.

A critical need exists to increase both the number of and sustainability of the Governor’s STEM Academies and Governor’s Health Sciences Academies across the Commonwealth. While school divisions’ budget priorities change from year to year, the Governor’s Academies need reliable, sustainable, and identifiable funding streams to ensure that Virginia maintains a competitive domestic and global workforce. Funding is needed to support state-of-the-art equipment, instructional resources, and work-based learning experiences that will enable students to earn industry credentials (licenses, certifications, etc.).

A permanent line item in the Commonwealth’s biennial budget will assure that Governor’s Academies have the same level of priority as Governor’s Schools. At the top of these priorities is ensuring the long-range viability of the Governor’s Academies. The Governor’s Academies have been a priority in the administration of the last three governors. However, as political positions change and budget battles rage, the consistent priority must be to educate and train a future competitive workforce.

BACKGROUND

The National Governor's Association Center for Best Practices (2014, <http://www.nga.org/cms/stem>) reports, "Economic growth in the 21st century will be driven by our nation's ability to both generate ideas and translate them into innovative products and services. Improving high school graduation rates and ensuring that all students are ready for college and the workforce is vital to states' ability to compete in the global economy. State leaders increasingly view science, technology, engineering, and mathematics (STEM) achievement as a critical component of success in college, career and life." Throughout the Commonwealth, this is commonly called "college and career readiness." "STEM education for all students is linked to our nation's future prosperity," the Center says, "... Governors are in a unique position to advance comprehensive STEM education policy agendas aligned with workforce expectations that will ultimately aid state economic growth. Governors can elevate the urgency and build the political will to advance STEM education and use budgetary and policy levers to make meaningful changes across education systems."

According to the Washington Post (April 2014), "Companies say they urgently need to hire workers with STEM skills, but they are frequently unable to find people who have the right knowledge and training. Meanwhile, many Americans today struggle to find work, having been left behind by a labor market in which more and more jobs require at least some technical know-how."

Health Sciences careers at all levels are among the fastest-growing and highest increases in numbers in the workforce (Bureau of Labor Statistics, 2014). This is due in part by the aging baby boomers, increased longevity, access to health care and, more importantly, the demands of Virginia's citizens. Maintaining a skilled workforce pipeline is predicated on early clinical experiences that the Governor's Health Sciences Academies provide in the areas of therapeutic services, diagnostic services, health informatics, support services, and biotechnology research and development.

Governor's STEM Academies are designed to expand options for the general student population to acquire STEM literacy and other critical skills, knowledge, and credentials that will prepare them for high-demand, high-wage, and high-skill careers in Virginia. Each academy is a partnership among school divisions, postsecondary institutions, and business and industry. According to the Virginia Department of Education, "STEM literacy is an interdisciplinary area of study that bridges the four areas of science, technology, engineering and mathematics. STEM literacy does not simply mean achieving literacy in the individual strands. STEM classrooms shift students toward investigating and questioning the interrelated facets of the world."

When U.S. Senator Tim Kaine was governor of Virginia, he established the Governor's Career and Technical Education Academies (Governor's STEM Academies) based on the National Governor's Association national priorities. The Academies parallel the Virginia Governor's School Program, which began in 1973 under the leadership of Governor Linwood Holton, who

established three summer residential programs for 400 gifted students from across the commonwealth. Today, the program has expanded to more than 40 sites throughout the commonwealth.

Since 1973, the economic and workforce needs of the Commonwealth have changed, yet one aspect, the student, has remained constant. Each year, hundreds of outstanding young students come to one of the different Governor's Schools in search of knowledge and eager to accept the challenge of acquiring advanced skills. Each cohort makes the Governor's School programs a special experience by creating a community of learners who demonstrate their remarkable talents in diverse and meaningful ways. In this context, the need to sustain the Governor's Schools is the same as the need to sustain the Governor's STEM Academies and Governor's Health Sciences Academies. Moreover, the current Virginia economy is in need of exactly this sustainability, as shown by:

- Governor McAuliffe's Executive Order 23 (2014), which establishes the New Virginia Economy Workforce Initiative, intends to build a strong economic and workforce initiative in Virginia. Item 1 in the executive order details the actions to establish goals and identify opportunities to increase statewide attainment rates of credentials that align with employer needs. As stated, "Virginia will set a goal of attaining 50,000 STEM-H credentials, licensures, apprenticeships, and associate degrees that meet the immediate workforce needs"
- Governor's STEM Academies and Governor's Health Sciences Academies complement Governor's Schools and efforts are refocused to align with Virginia's STEM goals.
- The 23 Governor's STEM Academies are designed to expand options for students to acquire STEM literacy and critical technical knowledge and skills, while earning an industry credential.
- The nine Governor's Health Sciences Academies represent a partnership between public school divisions, healthcare institutions, the private sector, and institutions of higher education to create rigorous programs to prepare students for careers in the health sciences.
- Governor's STEM Academies and Governor's Health Sciences Academies are designed to expand options for the general student population to acquire STEM literacy and other critical skills, knowledge and credentials that will prepare them for high-demand, high-wage, and high-skill careers in Virginia. Each academy is a partnership among school divisions, postsecondary institutions, and business and industry.
- Governor's Academies are designed with work-based learning experiences using internships, job shadowing, mentorships, clinical experiences, cooperative education, service learning or a combination.
- The Virginia Employment Commission forecasts that the top high-growth STEM and health occupations in Virginia by 2020 will include:
 - 175 STEM-specific occupations

- Job growth that equates to more than 130,000 new jobs
- 83% of STEM jobs pay more than the average wage for all occupations
- Developing and implementing a Governor’s STEM Academies and Governor’s Health Sciences Academy involves extensive planning and discussions among the participating partners.

The Virginia Association for Career and Technical Education (VACTE) supports college and career readiness while placing particular emphasis on Career and Technical Education programs that address current high-demand jobs and anticipated employee shortages, especially in the fields of science, technology, engineering, and mathematics (STEM) and the health-care sciences.

Currently, school divisions approved for a Governor’s STEM Academy or Governor’s Health Science Academy receive small planning grants.

Funding is needed to equip or update laboratories to meet the needs of rapidly changing needs of workforce preparation. Sustained funding is needed for school division to provide curriculum that prepares students with a rigorous and relevant program of study. Instructional labs and equipment range from \$30,000 to \$250,000 per laboratory.

The Commonwealth of Virginia will create a viable future by assuring that there is incentive to create and sustain Governor’s STEM Academies and Governor’s Health Academies in every school division.

Goals are statements of what the developer of the particular educational intervention hopes to accomplish. The importance of attending to goals in the design of educational interventions cannot be overemphasized, as goals are the driver for an iterative process of educational change.

Goals for students pursuing STEM careers:

- Incorporate rigorous academic content with career and technical instruction;
- Have an emphasis on a STEM career pathway;
- Develop individualized high school plans to ensure course selections that are aligned with students’ transition to postsecondary education and career goals after high school;
- Participate in a work-based learning experience
- Ensure that graduates complete a college and career readiness curriculum for a particular career pathway; and
- Incorporate *Virginia’s Workplace Readiness Skills for the Commonwealth*.

Goals for students pursuing health science careers (STEM-H):

- Incorporate rigorous academic content with career and technical instruction;

- Develop comprehensive knowledge and skill in the five career pathways in health sciences:
 - Therapeutic Services
 - Diagnostic Services
 - Health Informatics
 - Support Services
 - Biotechnology Research and Development.
- Develop individualized high school plans to ensure course selections that are aligned with students' career goals after high school;
- Participate in a work-based learning experience
- Ensure that graduates complete a college and career readiness curriculum for one of the five health science career pathways; and
- Incorporate *Virginia's Workplace Readiness Skills for the Commonwealth*.

Some of these goals are high-level, such as encouraging more young people to enter STEM careers and increasing student interest in STEM subjects. Goals may also include more specific objectives, which are usually framed in a way that supports assessment of student learning or other outcomes. For example, an objective may be to provide students with learning experiences that support their ability to analyze how components of simple machines interact to produce desired outcomes.

In practice, goals and objectives are often used interchangeably, and some goals overlap. Many STEM programs and projects address more than one goal, sometimes for both students and educators. In some cases, goals serve more as indicators of general aspiration rather than as guides for the design and evaluation of programs, thus raising questions about the degree of focus on achieving goals as opposed to using them as statements of aspiration. Notwithstanding these complexities, it is important to identify the goals of a particular initiative; the absence of goals specified or even implied raises questions about the design of the initiative (Adapted from NRC (2009)).

CONCLUSION

If Commonwealth of Virginia wants a significant number of high school graduates who are academically and technically serious about career goals in STEM and/or Health Sciences, a permanent General Assembly line item is required that will incentivize school divisions to start and sustain Governor's STEM Academies and Governor's Health Academies.