



House of Representatives
COMMONWEALTH OF PENNSYLVANIA
HARRISBURG

HOUSE DEMOCRATIC POLICY COMMITTEE HEARING
Topic: Environmental Education Programs
Riverbend Environmental Education Center – Gladwyne, PA
October 24, 2018

AGENDA

- 2:00 p.m. Welcome and Opening Remarks
- 2:10 p.m. Panel One:
- Cindy Adams Dunn
Secretary
Pennsylvania Department of Conservation and Natural Resources
 - Laurie Bachman
Executive Director
Riverbend Environmental Education Center
 - Erin McCool
Director of Education Programs and Strategic Initiatives
Riverbend Environmental Education Center
- 2:50 p.m. Panel Two:
- Judd Pittman
Special Consultant to the Secretary of Education for STEM
Pennsylvania Department of Education
 - Christopher Dormer
Superintendent
Norristown Area School District
- 3:20 p.m. Closing Remarks

Democratic Policy Hearing Statement
Host: State Representative Mary Jo Daley
October 24, 2018

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There is nothing new about the need to prepare students today to be leaders for tomorrow. However, the ways to effectively engage youth and prepare them for an uncertain future does change with the times. Given the challenges we face today, environmental education is a critical resource that provides a platform to effectively engage students in their communities today so they will be the prepared, resilient leaders we need tomorrow.

Some of the most urgent challenges that we currently face, centered on the modern idea of living sustainably, began in earnest with the Industrial Revolution. By the mid-20th century the concept of environmental science was taking shape. The first Earth Day was celebrated on April 22, 1970 to create a day of environmental education and awareness after seeing the oil spill off the coast of Santa Barbara in 1969. Riverbend was founded shortly thereafter in 1974, along with many other grass roots nature centers across the country. Since the 1970s, public awareness, environmental sciences, ecology and technology have advanced to include issues such as ozone depletion and global climate change. Driving this is humanity's exponentially increased demand on the planet due to population growth and increasing consumption. Therefore, Riverbend must evolve to meet the challenges of the day and teach our children to lead and to act responsibly.

Environmental education is a process that helps individuals, communities, and organizations learn more about the environment, develop skills to investigate their environment and to make intelligent, informed decisions about how they can help take care of it. As we look through this increasingly magnified lens of sustainability, it is important that students learn about the interdependencies of ecosystems and human systems. They need to understand how the consumption choices they make alter our ability to live sustainably. It is imperative to equip students with the understandings and habits of mind needed to shape and adapt to the world in which we all live.

Our economy thrives on a healthy environment as the environment sustains all life on this planet. The movement toward sustainable living is strengthening across all sectors of the economy. Therefore, an environmentally literate public is at the heart of a sustainable future. However, environmental literacy in the US is lacking. Environmental misconceptions are rampant and many believe this is due to how environmental education is addressed in schools. 95% of U.S. adults support environmental education in schools, yet a stunning 80% of adults are influenced by incorrect or outdated environmental myths. Just as language literacy is critical for leading a productive, secure life so is environmental literacy. It is

essential that every citizen become engaged in tackling the environmental problems of our present and future. That can only happen when people are well-informed.

At Riverbend, we work to develop environmental literacy that is grounded in science, using tested education tools. To advance environmental literacy Riverbend uses nature as the foundation to teach science and environmental principals. These are what we call nature-based STEM programs. Using nature as a platform for learning is effective because of its intrinsic value. It is something that people actually care about and are motivated to learn about. These are authentic learning experiences. Hands-on. Relevant. Real world. Interdisciplinary and cross-curricular. It goes beyond the mere transfer of knowledge; it creates connections between school learning, the community, and the world beyond.

Riverbend has studied the landscape of unmet needs and our capacity to effect change through environmental education in this region. We believe the greatest opportunity is centered on partnerships with teachers, schools and school districts. We focus on developing programs that, if proven effective through research and evaluation, are designed to be scaled. Exposure to high-quality environmental science learning can have a powerful impact on a student's interests and competencies as they navigate middle school, high school and beyond.

Children from disadvantaged communities have the greatest unmet needs. Therefore, we have invested substantial resources in serving teachers and students in lower income, urban communities in Philadelphia and Norristown. Leveling the playing field and creating opportunities for poor children is the right thing to do from an educational, environmental and economic lens.

This conversation intersecting education, the environment, and the economy is more urgent than ever. And so is Riverbend's purpose. Our overall intention is to motivate and educate students to care for our natural world. We strive to foster an awareness and appreciation of our total environment and to develop the understanding and skills to address global challenges. To be successful, we need support from every sector of our economy. By growing both the love of nature and environmental literacy, we aim to inspire action that contributes to healthier and more civically engaged communities. We aim to prepare the resilient leaders we need for tomorrow.

Environmental Education as a Catalyst for Change

Erin McCool

Director of Education and Strategic Initiatives

Riverbend Environmental Education Center

October 24th, 2018

The world is facing complex environmental problems. I strongly believe that we as a society have all of the tools and information to solve these problems. Experts predict that by the year 2050, there will be more than 9 billion people on earth. To feed this growing global population, we must increase our food production by more than 50%. This needs to occur in the face of problems like climate change and water scarcity. Riverbend studies the impact of food on the environment through our Building STEM Skills through Aquaponics program and there are so many examples of where sustainable solutions can be implemented. We waste 40% of food that is currently produced-about 133 billion pounds in the United States alone. Food that could be distributed differently to provide nutrition but through innovative thinking around sustainability, is now being considered for use as a biofuel to create electricity.

Modern students have limitless access to information and resources through technology. It is critical now more than ever before to provide students with context and resources so that they can build essential skills like analysis, critical thinking, collaboration and communication. Environmental education provides authentic context and relevance that form the platform for this holistic approach to education.

Riverbend's approach to environmental education is to use nature as a platform for scientific discovery. STEM; the intersection between science, technology, math and engineering can be explored infinitely on our 30-acre open space preserve, harnessing children's inherent curiosity in the natural world and longing for authentic experiences. We provide the time and space for students to develop comfort in nature and then introduce the science inquiry process.

Imagine walking across the preserve today and ducking off the main path to explore a wooded forest. At first, you may notice the size of the trees, the smell of the mulch path and the sounds of birds soaring in the air. When you take a closer look, you will put your hands on the earth, flip over a log to see the microcosm hiding in plain sight. You feel the rush of surprise when a salamander scurries out, across your shoe and into the brush. You will go a little further and pick up a piece of spongy log and wonder where it came from. It feels cold and soft and not what you may think a piece of a tree trunk may feel like. So, you may ask yourself, what is this? **This is where scientific inquiry begins.** This is where our educators shift their role from nature preserve host to guide on the side, supporting students as they create their own investigations to explore their questions. Educators may ask students to observe the log a bit more closely. What do they think is happening? What evidence supports that? If we can't see the answer in front of us, how may we investigate further? Students will make close observations of the log, the conditions and the organisms that they find. They may do some internet research to learn about adaptations and construct theories about how these organisms drive the decomposition of the

log. They may use a field microscope to look closely at the mouthparts of the organisms they see and imagine how this process can take a hardwood log to a spongy soft, decomposed piece of wood. Educators then layer on information about the nitrogen cycle and students begin to develop a picture of how nitrogen moves through the ecosystem, from the decomposing organism eating the log and then excreting it, sending nitrogen back to the soil to fertilize the living hardwood trees around them.

We call this approach nature-based STEM. With underpinnings in inquiry-based learning, hands-on activities and real-world, relevant content, nature-based STEM leverages student's inherent curiosity of the natural world to build authentic learning experiences. Through this process, students develop critical science skills in observation, developing questions, collecting data and forming hypotheses. In this manner, Nature-based STEM supports teachers in reaching their academic goals and is not an addition to their curriculum.

There is a new sense of urgency regarding environmental issues that generated so much attention 45 years ago. Environmental concerns today go beyond wildlife and nature. We are facing threats to public health, infrastructure and economy. Teachers are at the forefront of preparing students to deal with these issues, but their own preparation has not kept pace with advances in climate science and the scientific consensus around it. In a recent study of teachers across the United States, more than half of all surveyed science teachers were unaware that more than 80% of climate scientists think that global warming is caused primarily by human activities. One in three teachers give voice to non-scientific or political explanations of climate change, sending mixed messages to students and failing to provide good mentoring how to interpret and analyze science information. One high school environmental science teacher explained to me recently; "I do not address climate change in the classroom because it is a political issue and I feel that students should be able to decide if climate change is real and human caused". Another elementary school teacher indicated that she was uncomfortable talking with her students because she felt ill-equipped to talk about a complex and scary issue with young children. Students will continue to be exposed to stories about climate change through the internet, news media and word of mouth, which is all the more reason that we need to prepare teachers to address these issues in the classroom.

To solve these issues, we must prepare our formal educators to teach complex and relevant science issues in the classroom. Formal classroom teachers face mounting pressures that impede their ability to get up to speed on complex science issues, making partnerships with informal education programs a necessity. One study indicated that just 5% of learning in one's life happens in the formal classroom. This means that an overwhelming 95% of learning happens in informal spaces-the workplace, evening news and informal learning centers like Riverbend. Informal learning centers provide real-world authentic experiences which we know are the foundation for STEM learning. Students need to find relevance in learning to be successful.

These experiences take time and resources to implement and most environmental education centers rely on individual fundraising and limited program revenue to support education programs. This creates a challenge for schools, in particular those with limited control of their budget. We use evidence and data to make decisions about programs and assess participant outcomes both quantitatively and qualitatively. Teachers value our programs and benefit from the social capital built through informal education networks. A recent study of Riverbend's Philadelphia Children Access Nature program showed an increase in knowledge and confidence in teaching environmental science across all teaching fellows.

Teachers consistently report that students benefit from experiences with informal education centers. These experiences help students make connections between different subjects, creating deeper learning and lasting memories. Teachers use these experiences as equalizers; referring back to shared experiences throughout their instruction in multiple subjects. Many adults can pinpoint very specific informal education experiences like field trip and classroom visits as instrumental to their chosen career paths and socio-emotional development.

Despite the evidence that demonstrates the effectiveness of environmental education programs, we must work hard to adequately scale and sustain our programs. Alongside schools, we struggle to find the time within academic calendars to bring students outside of the classroom. Teachers have limited time to participate in critical professional development and funding models are different across school districts. Despite understanding what it takes to build environmental literacy, we are challenged to provide enough meaningful experiences to move the needle for our communities. Riverbend is committed to finding solutions to provide high quality environmental education experiences grounded in science and producing measurable outcomes. We have built strong partnerships with school districts, universities and funders to support our work but policy support will go much further in creating systems that value and support the implementation of informal education in schools.

Straddling two worlds, environmental education pulls expertise from science content experts as well as formal education. The environment touches every citizen in some way and therefore we can all find something to relate to in nature. It provides unique connections between so many disciplines, from science to math, English, civics and beyond. I strongly urge you to consider the value of environmental education provides to the corporate sector, public policy and formal education systems as you consider policy. Every child has the right to experiences with nature and these experiences are critical to their individual development as well as our future as a society.



pennsylvania
DEPARTMENT OF EDUCATION

Testimony

presented to the

House Democratic Policy Committee

Judd Pittman, Special Consultant to the Secretary of Education

Wednesday, October 24, 2018

Good afternoon, Chairman Sturla, Representative Daley, and members of the House Democratic Policy Committee. Thank you for hosting us today and for your interest in working with the Pennsylvania Department of Education (PDE) to learn more about STEM education that brings together educators, students, business owners and community partners to connect resources across disciplines in the education, workforce, and environmental sectors.

My name is Judd Pittman and I am the Special Consultant for STEM to the Secretary of Education. It has been my charge since joining the department, to bring my experience in the STEM classroom and working in cross-sector partnerships to help support and assist schools across the commonwealth that are taking the initiative to create positive change by prioritizing STEM in their communities.

THE OPPORTUNITY

By 2025, more than 60 percent of family-sustaining jobs in the commonwealth will require some postsecondary education, a demand that shaped the statewide attainment goal established by Governor Tom Wolf in 2015.¹ Currently, 45 percent of Pennsylvanians hold these credentials, and a significant skills gap continues to persist for the commonwealth's current and emerging workforce, particularly in fast-growing fields of Computer Science (CS) and Science, Technology, Engineering, and Mathematics (STEM).

National and regional data suggest that a STEM-ready workforce is necessary for Pennsylvania to compete in the global economy. It is estimated that, by 2020, employers across the country will need an additional 1.6 million workers skilled in STEM.² In Pennsylvania, STEM jobs are projected to grow by 9.1 percent between 2016-2026³; computer jobs are expected to grow by 10 percent, engineering by 4 percent, and advanced manufacturing by 5 percent.⁴ An estimated nine in 10 STEM jobs will require education beyond high school.

Yet, between 2014-2015, only 31 percent of postsecondary certificates and degrees earned by Pennsylvania learners were in STEM-related fields. Considering anticipated retirements in the engineering field, the need to ensure pathways for equitable access to STEM experiences for all students in Pennsylvania is even more urgent.

¹ This goal – that at least 60 percent of Pennsylvania residents have some form of postsecondary education or training by 2025 – was also supported by the Pennsylvania's State Board of Education in November 2016.

² U.S. Department of Education and American Institute for Research (AIR). STEM Leaders Workshop Report: "STEM 2026."

³ PASSHE Report 2016-2026: An Analysis of the Economy Facing Tomorrow's Workforce. Appendix B-1.

⁴ Change the Equation | [Pennsylvania Vital Signs](#)

Pennsylvania's future depends on our young people having the ability and opportunity to solve society's greatest challenges. This requires that we build the capacity of every learner to be resilient problem solvers and good communicators. They must be able to collaborate with a diverse range of people and deploy a broad range of skills, from design thinking to computational thinking. Every learner must be prepared for the needs of the STEM workforce.

To ensure that Pennsylvania remains competitive in a rapidly changing economy, this year Governor Wolf successfully advocated for \$30 million in state funding to support the [PAsmart Initiative](#), which provide strategic, cross-sector investments focused on meeting the workforce development needs of students, workers, employers, and communities across Pennsylvania, including opportunities related to computer science and STEM. With this funding, Pennsylvania has the second highest investment in STEM Education in the nation.

THE PROBLEM

So what is STEM?⁵ STEM education is an integrated, interdisciplinary, and student-centered approach to learning that encourages curiosity, creativity, artistic expression, collaboration, communication, problem solving, critical thinking, and design thinking. Essentially, understanding STEM requires students to be inquisitive problem solvers who understand how to make discoveries. They must use critical thinking and logic to make sure that their solutions work and are often solving complex problems in teams.

While opportunities in STEM abound, not all students have access to meaningful, high-quality STEM education or the prosperous long-term career pathways they promise. According to a recent national report from Change the Equation, there are significant disparities in access to hands-on science activities between students in high-poverty elementary and middle schools compared with their peers in wealthier schools.⁶

Research suggests, and analysis⁷ from the PA Department of Education (PDE) confirms, that students' access to high-quality CS/STEM education varies significantly. Last year, only 2.1 percent of Pennsylvania students took computer science and related courses. Boys are twice as likely to take computer science courses as girls in Pennsylvania. Only 3,058 high school students took the Advanced Placement (AP) Computer Science exam in 2017. Of those students, only 22 percent were female, only 146 students (4.7 percent) were Hispanic/Latino, and 84 students (2.7 percent) were African American.⁸

THE APPROACH – STEM ECOSYSTEMS

Over the past three years, under Governor Wolf's direction, Pennsylvania has established a strong and innovative culture for STEM learning by strengthening STEM experiences for all students, supporting professional development for educators, and forming diverse partnerships across the commonwealth.

The Pennsylvania Department of Education (PDE) has increased its focus on state-level support for STEM education, conducting more than 60 STEM stakeholder sessions across the commonwealth, establishing the Pennsylvania STEM Coalition as a statewide STEM network for stakeholders from early learning, K-12,

⁵ Pennsylvania's definition of STEM education was developed by the PA STEM Coalition.

⁶ [Ending the Double Disadvantage: Ensuring STEM Opportunities in Our Poorest Schools](#), Change the Equation, July 2017,

⁷ PDE Computer Science/Information Technology Data Dashboard:

https://public.tableau.com/profile/padepstofed#!/vizhome/PAITCourseEnrollment_0/StudentsInITandComputerScienceCourses

⁸ *K-12 Computer Science Education in Pennsylvania*, Code.org, <https://code.org/advocacy/state-facts/PA.pdf>.

higher education, libraries, workforce, state agencies and business and industry to work together to advance STEM. Currently, the Coalition includes more than 400 members.

With the Coalition efforts as a foundation and through additional state support to individual and district level programs, Pennsylvania was able to build out coherent STEM mission, vision, and definition along with a comprehensive approach to improving STEM opportunities for all learners, “**STEM Ecosystems**”. STEM ecosystems are communities that integrate resources from business, industry, philanthropic organizations, traditional education networks, afterschool providers, public libraries, museums, and others to provide high-quality STEM experiences for all students. Pennsylvania has five of the nation’s 68 STEM ecosystems formally recognized by the STEM Funders Network,⁹ making the commonwealth third only to California and New York as a national STEM Leader. Pennsylvania’s commitment to the ecosystem approach has resulted in three state-recognized ecosystem partnerships and six emerging communities in 2018. At the center of these ecosystems is the learner. The STEM Ecosystem serves as the connection to equitable in-school and out-of-school STEM opportunities for the student to build their own STEM identity, literacy, skills, and knowledge.

STEM Ecosystems provide a strategy for engaging every young person in STEM. STEM identity is a key indicator of success in STEM-related opportunities in Pennsylvania. Since 2012, interest in STEM postsecondary opportunities (college or career) has increased by 5 percent. Despite these gains, significant equity gaps remain: only 13 percent of African American and 28 percent of Hispanic students display STEM interest and readiness, compared with 46 percent of their White peers.¹⁰ Schools, libraries, nature centers, and YMCAs all provide opportunities to engage every young person in STEM learning.

STEM Ecosystems **connect STEM learning opportunities across multiple settings**. Students want relevant, connected and real-world learning experiences. To meet that need, students should be provided with coherent learning opportunities both in and out of school. Multiple settings challenge students to build complex skills. They can design, test, revise, collaborate, and communicate solutions to real world challenges and bridge the gap between community and classroom. Coherent experiences beyond the classroom build complex STEM skills like computational thinking, design thinking, critical thinking, creative thinking, communication, collaboration, and resiliency.

STEM Ecosystems **pair students with educators with a STEM mindset and with STEM tools**. Only 4 percent of 4th grade students in Pennsylvania’s public schools have a teacher with an undergraduate degree in math.¹¹ Integrated STEM ecosystems connect the classroom with experts in the field working on needs, opportunities, and challenges in the community.

⁹ [STEM Funders Network | STEM Ecosystems Interactive National Map](#). Pennsylvania’s five formally recognized STEM ecosystems include: Philadelphia STEM Ecosystem; Lancaster County STEM Alliance; Schuylkill/Carbon/Luzerne Region Ecosystem; Pittsburgh Area STEM Ecosystem; and PA SEED (Bucks, Chester, Delaware, and Montgomery Counties) STEM Ecosystem.

¹⁰ The Condition of STEM 2016 | Pennsylvania Report | [Prepared by ACT](#)

¹¹ Change the Equation | [Pennsylvania Vital Signs](#)

GOALS

PDE is working to establish and sustain STEM Ecosystems in each of the five geographic regions (Northwest¹², Southwest¹³, Central¹⁴, Northeast¹⁵, and Southeast) of the commonwealth.¹⁶ The comprehensive approach will grow by 2024 to a STEM Learning Ecosystem in each of the top 10 metropolitan areas¹⁷ in Pennsylvania.

Through this expansion, we hope to have a broad impact that includes:

- Using metrics to determine impact of STEM Ecosystem from learner to community;
- Co-constructing tools for ensuring equitable access to high-quality, rigorous STEM experiences for every learner;
- Identifying and designing solutions to local, regional, and statewide workforce gaps by generating connections between PreK-20 education and workforce¹⁸; and
- Providing technical assistance for communities across the commonwealth to establish a STEM learning ecosystem with the support of their local Intermediate Units, school districts, community organizations, workforce development boards, economic development groups, chambers of commerce, postsecondary institutions, families, and businesses.

Intentional cross-sector collaboration is a key component to strengthening the coherence of STEM Ecosystem networks. Strategies and policies that provide guidance for use of resources, incentives for collaboration, and pathways to intermittent or sustainable funding streams help establish coherent and equitable STEM pathways for every learner.¹⁹ STEM Ecosystems must leverage the diversity of STEM stakeholders to ensure entry points for every child along the STEM continuum PreK-20 and across STEM settings formal and informal. Cross-agency collaboration connecting education, agency and workforce will focus on braiding funding streams, promoting coherence from education to workforce,²⁰ establishing a coherent educator workforce partnership playbook, making sure there is consistent communication to STEM stakeholders.

CURRENT WORK

There is much that has already been done as part of its statewide efforts to advance equity and access to STEM education across the Commonwealth. PDE has established a statewide communication network and strategy for STEM education, and developed technical assistance and professional development resources for educators. The Department has STEM points of contact at 28 Intermediate Units (IU), all of whom have undergone training through the Carnegie STEM Excellence Pathway program, a nationally-recognized model.

¹² Intermediate Units 5 and 6 STEM Ecosystem and Seneca Highlands Intermediate Unit 9 STEM Ecosystem

¹³ Appalachia Intermediate Unit 8 with Pennsylvania Highlands Community College STEM Ecosystem

¹⁴ Franklin, Adams, York (FrAY STEM Ecosystem) Berks County STEM Ecosystem, North Central STEM Ecosystem which includes the BLaST Intermediate Unit 17, and Central Pennsylvania STEM Ecosystem which includes 11 counties and Intermediate Units 10, 11, 13, 15, and 29.

¹⁵ Northeastern Pennsylvania STEM Ecosystem (NEPA) which includes Intermediate Unit 19.

¹⁶ [ABC CREATE](#) is an informal serving parts of Northwestern Pennsylvania rural counties of Butler and Armstrong,

¹⁷ As defined by the U.S. Census, which include Philadelphia, Pittsburgh, Allentown-Bethlehem-Easton, Harrisburg-Carlisle, Scranton-Wilkes-Barre, Lancaster, York-Hanover, Reading, Erie, and State College.

¹⁸ Tools like the [Talent Pipeline Management](#)

¹⁹ U.S. Department of Education and American Institute for Research. STEM Leaders Workshop Report: "STEM 2026"

²⁰ STEM skills identification for middle skill and high skill STEM learning pathways.

The Allegheny IU and the Delaware County IU have trained over 2,500 teachers in Code.org's CS Fundamentals, Computer Science Discoveries, and Computer Science Principles²¹ courses, and have developed a comprehensive computer science administrators toolkit and curricular framework. PDE is currently working with 11 IUs and 50 educators to release a STEM Toolkit this December.

PDE has partnered with the PA Training and Technical Assistance Network (PaTTAN) and others to support professional learning opportunities across the commonwealth. Pennsylvania was one of 13 states to receive a National Science Foundation ACESSE Grant to support a comprehensive, 3-year professional learning experience for educators in grades K-3, developed in collaboration with Penn State University, ACESSE, Southern Tioga School District, and Steelton-Highspire School District. PDE has held 10 monthly one-hour sessions designed and led by PA STEM Coalition members to build a virtual professional learning community. In June of 2018 Pennsylvania held its first annual Computer Science for All Summit, which provided professional learning for 300 educators and 50 counselors.

As part of Governor Wolf's, "Government that Works" priority, PDE is:

- Supporting the PA Department of Labor and Industry with the Teacher in the Workplace grant program, providing industry embedded learning opportunities for over 60 communities in 2018.
- In collaboration with Stroud Water Research Center, the Department of Conservation²² and Natural Resources (DCNR), PA Department of Environmental Protection (DEP), and Millersville University, through a NOAA B-Wet Grant is meeting the Environmental Literacy priorities of the 2014 Chesapeake Bay Agreement and ensuring all students have a meaningful watershed education experience (MWEE).
- In collaboration with DCNR, DEP, and the PA Department of Agriculture, to fund a new Environmental Content Advisor position to support environmental education across the Commonwealth.

The Southeast region of Pennsylvania provides a strong model for other areas of the state with two national recognized STEM Ecosystems, an established Computer Science for All network²³ (CSforPhilly), exemplary school district models and other organizations championing the importance of STEM. During the fall of 2017 PA STEM Experiences for Equity and Diversity (PA SEED) Ecosystem was established in the four counties (Bucks, Chester, Delaware, and Montgomery) surrounding Philadelphia. The Ecosystem recently organized the first four county-wide PA SEED Days highlighting exemplary opportunities for all learners in STEM. Riverbend Environmental Education Center is one 25+ organizations²⁴ across the commonwealth that focus on the intersection between technology and agriculture through its work with aquaponics. The experience and skills students gain in aquaponics can transfer into careers in technological systems²⁵, agriculture, horticulture²⁶, business operations²⁷, and economics.

²¹ [Code.org | Pennsylvania Fact Sheet](#)

²² [NOAA Chesapeake Bay Office | Grant Awards](#)

²³ [CSforPhilly](#)

²⁴ This includes 12 LEAS in the Southwest Aquaponics Consortium, along with LEAs in Philadelphia, Norristown, Berks, Dauphin, Cumberland, Adams, and York counties.

²⁵ HVAC, Plumbing, Electrical

²⁶ Organic growing and integrated pest management

²⁷ Food safety, logistics, distribution,

SUCCESS AND RECOGNITION

Pennsylvania is receiving national recognition for efforts in STEM.

- In Fall 2016, Pennsylvania was recognized by for advancing equitable access to computer science education by being invited to the first Computer Science for All Summit at the White House.
- In Fall 2016, Pennsylvania was invited to the STEM Funders Network National Community of Practice meeting to share its strategies for building grassroots supports for STEM through statewide stakeholders sessions, the formation of the Pennsylvania STEM Coalition, and the department of education's role in supporting STEM Ecosystems.
- In October 2017, Pennsylvania officially became a CSforAll state by outlining state and local commitments and existing initiatives that demonstrate a commitment to promoting equitable access to computer science education for all students
- In January 2018, the Pennsylvania State Board of Education voluntarily endorsed the Computer Science Teachers Association Standards to guide computer science instruction in Pennsylvania.
- In Summer 2018, PDE has been recognized by Girls Who Code as the only state to publicly share disaggregated data on Computer Science Course taking patterns.²⁸
- In November 2018, PDE was invited to the STEM Funders Network National Community of Practice to share its strategies for cross agency efforts to support STEM education and STEM Ecosystems.

Through our continued investment in STEM ecosystems and our cross-agency collaboration, we aim to create a STEM-ready workforce that is prepared to compete in the global economy and fill Pennsylvania's needs. Through taking a sustainable, learner-centered approach to STEM education, we can continue to support communities that integrate resources from business, industry, philanthropic organizations, traditional education networks, afterschool providers, public libraries, museums, and others to provide high-quality STEM experiences for all students.

²⁸ [The Inquirer | How Pa. is working to close the gender gap in tech](#)