

Good Evening,

Gratitude for the opportunity

A little about me (ecologies degrees, education degrees, did climate science work in the northern boreal, teacher for 8 years, board member for 8 years, with the Secretary for the last 6 years.

Pennsylvania's Story

“Knowing Is Not Enough; We Must Apply. Wishing Is Not Enough; We Must Do.” – Johann Wolfgang Von Goethe

Today

Vision
Signals
Strategies and Initiatives
Learned
Questions



Beta Goals

Schools that Teach
Government that Works
Jobs that Pay



Governor Wolf Started his administration with the broad framework of....

Goal of generating evidence based program and policy making that takes a collective impact approach and brings caregivers, scholars, educators, workforce partners, communities closer to the center of the this strategy. Including their voice in the vision.

Vision

Increase and diversify the number of educators prepared to provide rigorous STEM and CS educational experiences P-20.

Increase and diversify the number of students with access to, and included in STEM and CS from P-20 to workforce.



PDE Vision on the Slide

We wanted to form a common language to work from.

We wanted to focus on our earliest and most marginalized / underserved scholars.

A focus and commitment to equity.

PASmart is based on four goals:

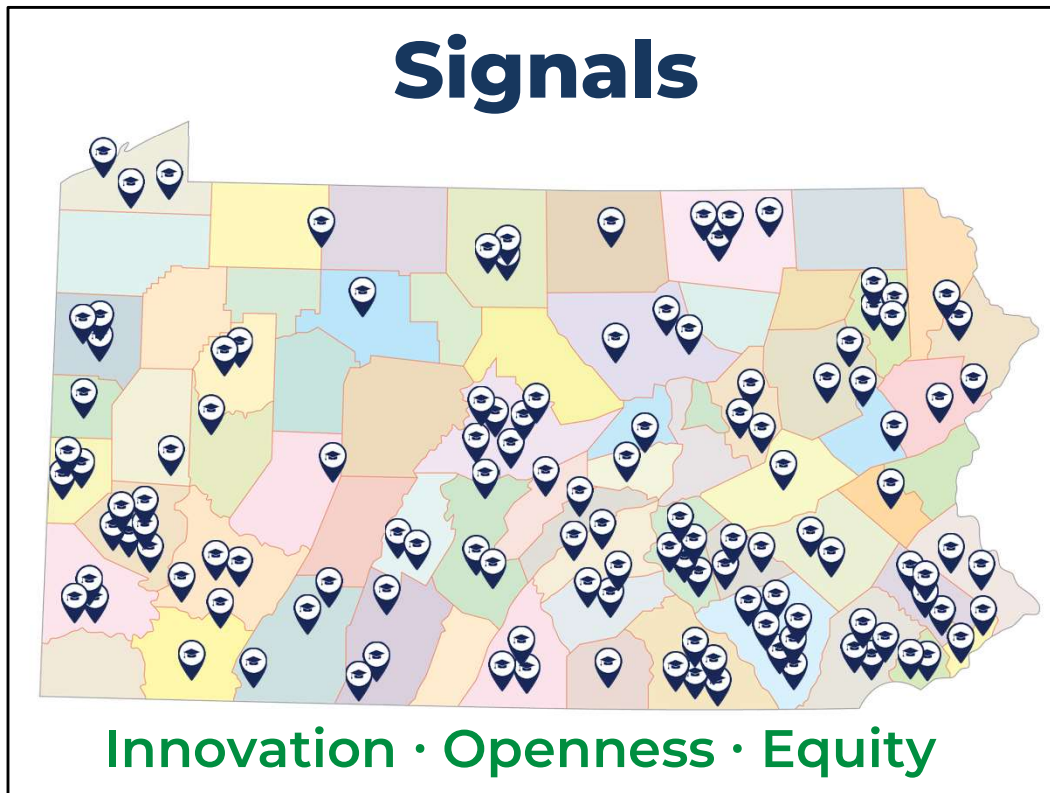
1. Strategically investing resources in initiatives to support economic growth, and education and training opportunities;
2. Achieving successful outcomes for Pennsylvania students, workers, businesses, and communities;
3. Improving coordination and alignment of education and workforce development programs, services, and funding; and
4. Transforming inter-agency, cross-sector collaboration around education, workforce, and economic development at state, regional, and local levels.

Priorities

- Increase and diversify the number of students PK-20 engaging in STEM related experiences **by at least 10,000 learners.**
- Increase and diversify the number of educators receiving professional learning in STEM by **20% each year through 2023.**
- Increase high schools offering 7-12 STEM courses by **75 schools each year** through 2023.
- Increase the number of LEAS with STEM related comprehensive plans **by 50% through 2023.**
- Establish **29** STEM Teaching and Learning Leadership Hubs **by 2023**
- Establish a **statewide comprehensive plan** for STEM and Computer Science Education **Prek to Career by 2023**



118 LEAS have a STEM Comprehensive plan using the Carnegie STEM Pathway of Excellence Tool
158 LEAs have a SCRIPT comprehensive plan



PDE Priorities: Innovation, Equity, and Openness

When we started this endeavor we had no STEM vision/alignment

Engaged Judd and stakeholders.

Core values Innovation, Openness, Equity

Listen!

:

In the first 12 months we held over 35 stakeholder sessions with a focus on uncovering the STEM Landscape

We engaged over 300 cross sector partners and ended the first year with a common STEM language including mission, vision, design principles, and common STEM Definition.

These early stakeholder sessions uncovered coherence between what educators wanted to teach and provide their students and what business / industry was looking for in a highly qualified and competitive workforce. It was our job to make the match happen for the commonwealth. We knew it would be important to tell the STEM story. This would help to elevate the types of teaching and learning that could best prepare our teachers and students for success while helping to give them support to take risks in the classroom during a high stakes testing atmosphere.

Some Themes that came from the initial sessions were:

- Focus on teaching skills through the STEM lens

- A need for computer science experiences for all kids
- STEM needs to be pervasive and transdisciplinary

During the STEM Stakeholder sessions computer science education continued to be a point of emphasis during conversation:

- A focus on the need for professional development K-12
- A focus on the need for guidance from the state regarding its direction on CS education
- Gaps in certifications and the need for more CS knowledgeable educators

Led to the formation of the Computer Science for All Work Group:

- 30 + educators (OCDEL, K-12, educators, administrators, business / industry partners, higher education partners, IU partners, PDE, career and tech education)
- 6 total meetings
- The team reviewed Pennsylvania's Business, Computer, and Information Technology Standards
- Led to the endorsement of standards and the 7/12 certification program guidelines

Continued State holder engagement has lead to nearly 100 sessions across the state uncovering and spotlight STEM

Lead to the formation of the Pennsylvania STEM Coalition with over 450 members currently

PAsmart Framework



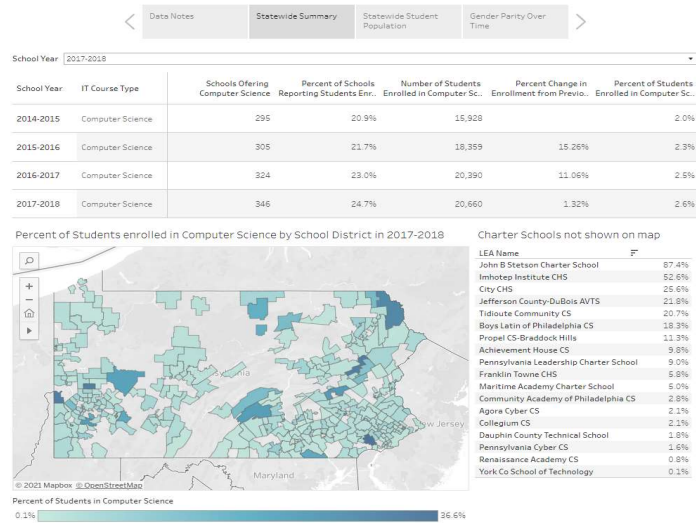
Conversations were started with the Middle Class Task Force and continued with the Workforce Command Center

PAsmart is based on four goals:

1. Strategically investing resources in initiatives to support economic growth, and education and training opportunities;
2. Achieving successful outcomes for Pennsylvania students, workers, businesses, and communities;
3. Improving coordination and alignment of education and workforce development programs, services, and funding; and
4. Transforming inter-agency, cross-sector collaboration around education, workforce, and economic development at state, regional, and local levels.

Signals

Pennsylvania Computer Science Course Enrollment



Innovation · Openness · Equity

Code.org: Course Choices

K – 6 = 8764 total enrollment

7 – 12 = 53,768

All the courses in the CS course codes

K – 6 = 122,572

7 – 12 = 216,686

Number of schools 1036

Number of LEAs 624 almost 80% of LEAs

% enrolled female 42.18131305

% enrolled black 11.68834166 %

enrolled Latino 12.2753662 %

enrolled low SES 41.10971636 %

enrolled special education 17.64904055 %

enrolled language learners 3.272015728

Number of white students enrolled 164203

Number of minority students enrolled 52483

Number of male students enrolled 125285

Signals



PDE has been committed since the beginning of the Wolf Administration to bring communities including educators, caregivers, and students closer to the center of policy and program creation

PDE has done a lot of listening over the last 18 months. We have listened to communities across Pennsylvania trying to understand and elevate the voice of all community members.

Things we have learned: PTAC Collaboration and Report

- Equity is a critically important conversation and topic for students and educators
- It is a necessity to build student agency and teacher agency in decision making from the classroom to the board room.

Remaking Tomorrow Report:

< <https://readymag.com/u673640268/2508445/recommendations/> >

Justice:

Deeply consider the social, emotional and mental health of students and staff as the foundation for learning in our communities is built on healthy, humanizing relationships.

- Actions connect out of school providers, and mental health providers with families, create a clear plan on how you are going to communicate with families ensure educators have PD on justice, equity and belonging to create inclusive classrooms

Methods:

Think differently about school schedules. Think differently about how we leverage valuable face to face time together.

Personalize learning with student driven learning plans.

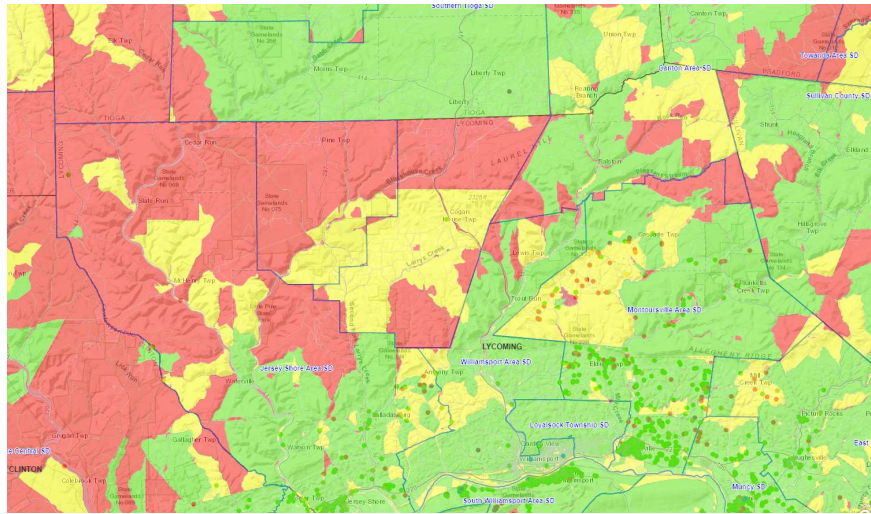
Focus on competency based learning

Relationships:

Focus on building impactful connections among districts, educators, students, families communitis

Leverage technology to build partnerships

Signals

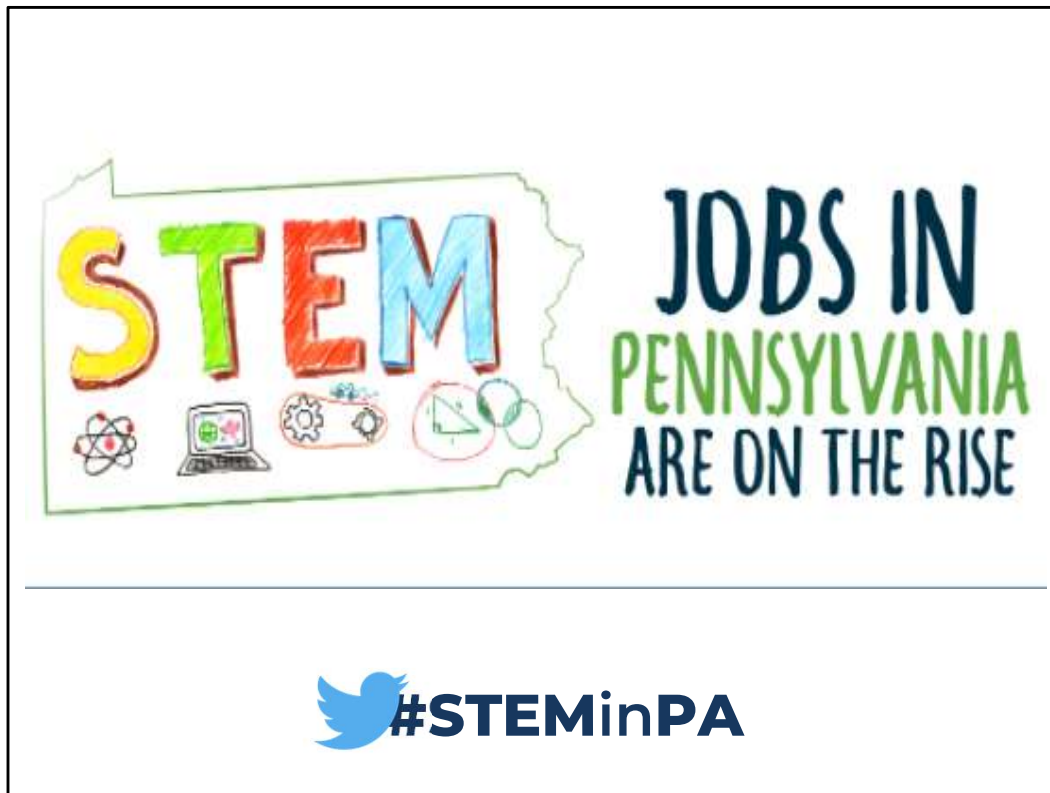


Connectivity

Despite short survey window timed with the closing of schools, we had 45,725 responses from parents in 377 school districts

Summary results:

- 21,012 surveys indicated 37,029 students lacked connected devices
- 5332 surveys indicated they lacked sufficient internet access at home
- 685 indicated there is no commercially available internet to their home.
- 2653 indicated the internet providers in their area cannot provide adequate bandwidth



3.5 million by 2026 needed

Fastest Growing in the medical occupations: [<https://www.bls.gov/ooh/fastest-growing.htm>]

- Wind Turbine Service Technicians (61%) \$53,000 | Similar technical skills to electricians, heating and air-conditions, plumbers, and elevator repair. Certificate program and community college
- Solar Photovoltaic (51%) 44, 890 | Similar technical skills to the construction trades
- Data Scientist (31%) 95K |
- Environmental Engineers (3%) 88K or Hydrologists 5%
- Computer Information and Research Scientists 15% 122K
- Water, Sewage, and other Systems | 7% | Industry Project
- Data Processing and hosting | 10% | Industry Projection
- Computer and Mathematical Occupations | 9.6%

Emerging fields include use of drones or unmanned vehicles for:

- Mapping and modeling,
- Surveying

As of October 2019 the top 10 employers 4/ 10 are STEM | all have STEM components

58% of all new jobs in STEM require computing skills

<https://code.org/advocacy/state-facts/PA.pdf>

8 of the fastest growing occupations in Pennsylvania are require computer science related skills with several of those occupations (Data Scientists, App Developer, Cloud Specialist) not existing 10 years ago

590,000 new and replacement jobs in Pennsylvania through 2026

PASSHE Office of Educational Intelligence 2016-2026 Report

Hardwoods a 10 billion dollar industry in Pennsylvania

<https://www.workstats.dli.pa.gov/Products/HPOs/Pages/default.aspx>

In that chat provide an example of a Green Job:

Green Jobs are defined as:

- Jobs in businesses that produce goods or provide services that benefit the environment or conserve natural resources.
- Jobs in which workers' duties involve making their establishment's production processes more environmentally friendly or use fewer natural resources.

Source: [<https://www.bls.gov/green/home.htm#overview>]

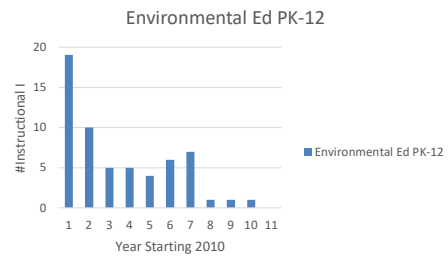
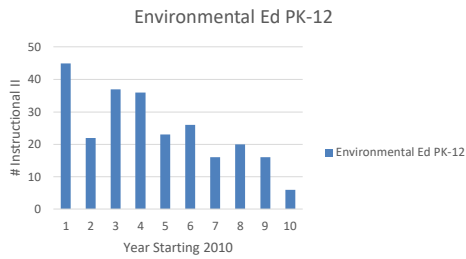
The United Nations defines green jobs as sectors and jobs in which waste creation and pollution is minimised (UNEP et al., 2008).

333 different industries identified as having classified green goods an services or produce green jobs [that have NAICS (6 digit codes) Source:

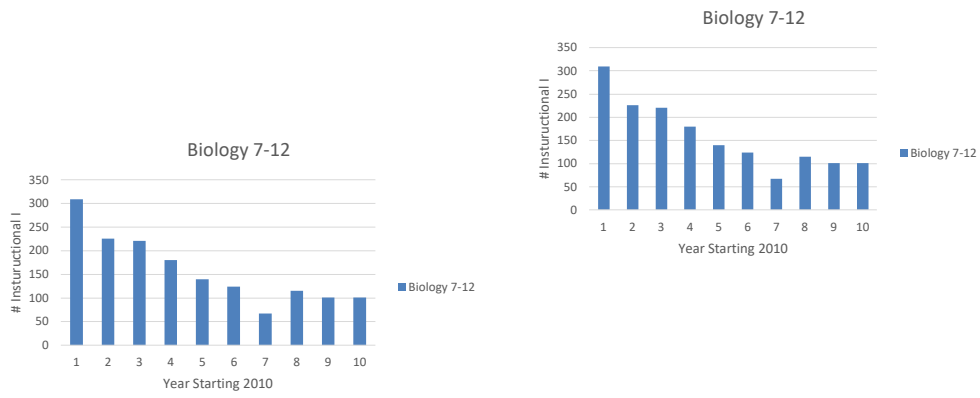
<https://www.bls.gov/green/home.htm#overview>]

Example: Construction, Manufacturing, Professional and Business services, Natural Resources / Mining

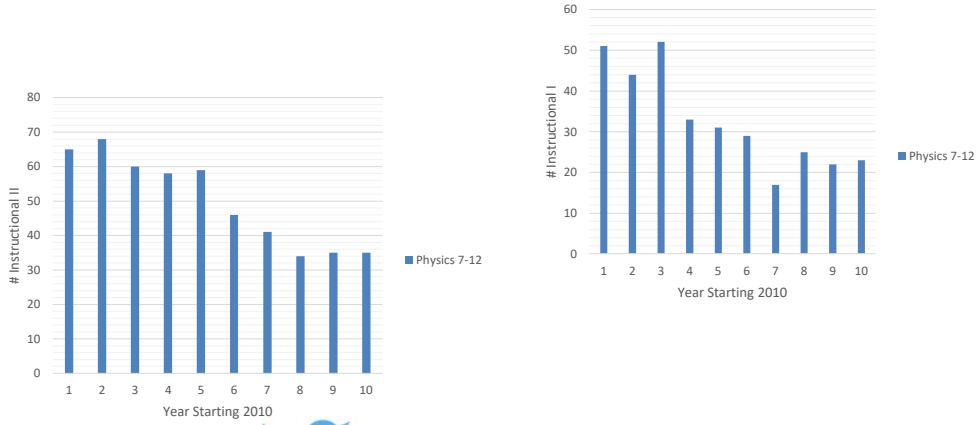
Workforce Outlook



Workforce Outlook

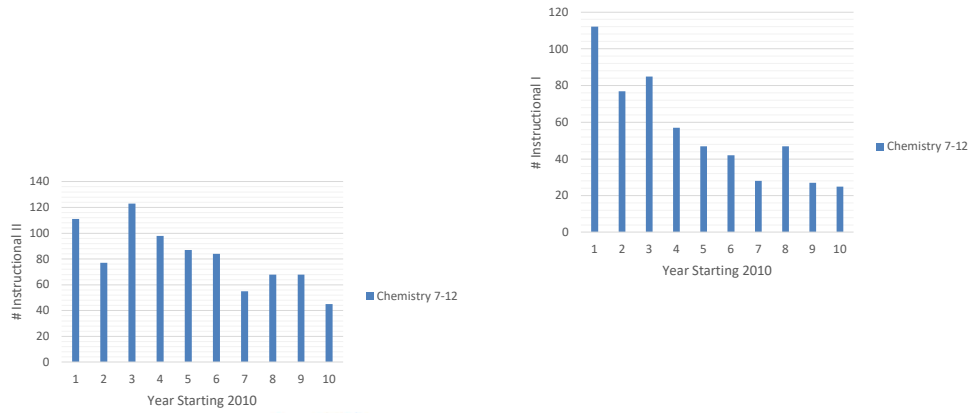


Workforce Outlook

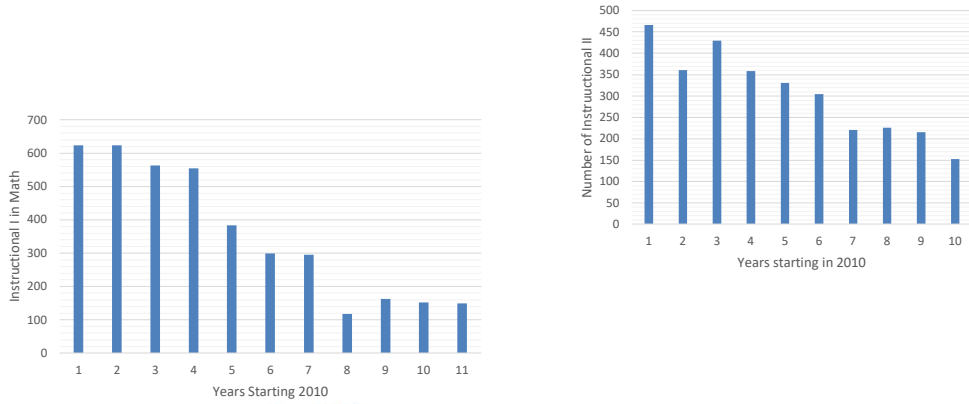


 **#STEMinPA**

Workforce Outlook



Workforce Outlook



 **#STEMinPA**

Math

#PAsmart

- **403 Targeted Grants**
- **50 Advancing Grants**
- **53 Build | Fly | Code Ambassadors Grants**
- **19 TACTICS Grants**
- **Teacher Certification Relief**
- **Apprenticeships Grants 100+**
- **50 + Next-Generation Sector Partnerships**
- **199 Teacher in the Workplace Grants**
- **7 – 12 Certification Pathway**



Starting in 2018 | 30 million dollar annual investment in education and workforce development of which 20 million is focused on STEM and Computer Science education.

State Board of Education endorsed the CSTA standards which would ignite the development of Pre-Service programs and a certification pathway.

(<https://www.pasmart.pa.gov/>) (<https://www.stem.pa.gov>)

Over a 60 million dollar investment in STEM and Computer Science since 2018

7 – 12 Certification Pathway:
5 Days of professional learning,
We_Teach_Course (500 free license)
PRAXIS relief, and certification filing fee relief

403 Districts received PAsmart Targeted Grants

PAsmart Initiative | 30 million dollar investment + State System of Support 1.5million + CS IGA 300,000 + STEM Toolkit 50,000 + CSforAll Summit 17,000 = Approximately 32million dollar investment

- Every IU has at least 1 LEA represented in the targeted awards

Advancing grants impacts 90% of the counties in Pennsylvania 24 total awards

- Involves 106 schools
- 26 Higher Education Partners
- 59 Workforce partners (WiBs, Business/Industry, Chambers, Economic Development Councils)
- 58 non-profits, libraries, science centers
- PAsmart is providing an example of how to braid state funding between partners

Next Generation Sector Partnerships:

- Goals: cross – sector strategies, collective impact model, business and industry driven priorities, collaborative solutions.
- Historical: 15-16 – 15 partnerships with 60% in advanced manufacturing or healthcare
- Historical: 17-18 – 28 partnerships 68% in the advanced manufacturing or healthcare space
- Historical: 19 – 20 – 26 4.7 million [<https://www.dli.pa.gov/Businesses/Workforce-Development/grants/Pages/PAsmartgrants2020.aspx>]
- <https://public.tableau.com/app/profile/cwia/viz/NextGenIndustryPartnerships-DESKTOP-01-07-2020/1-SelectionTab>

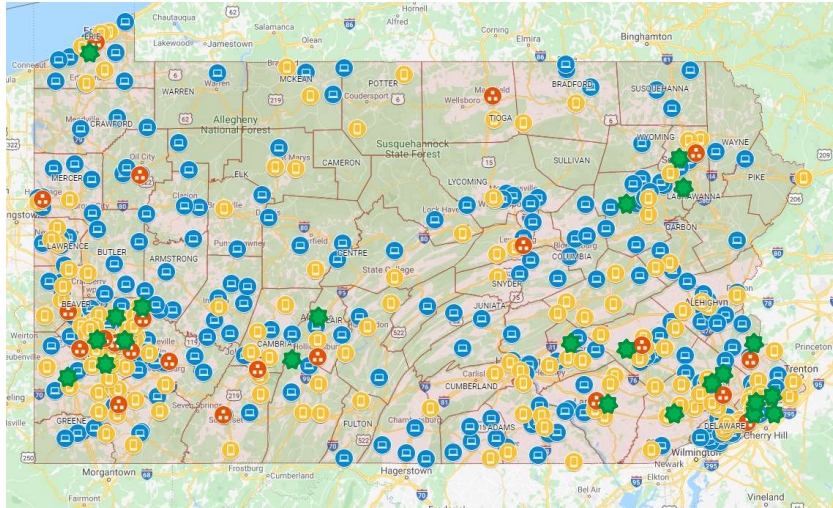
Apprenticeships: Early childhood apprenticeship program, and Norristown Teacher apprenticeship | The Apprenticeship to Mastery Program for Public School Teachers (AMP), a two-year non-traditional apprenticeship program for K-12 public school educators, has been approved by the Department of Labor & Industry (L&I) Apprenticeship and Training Office (ATO).

-2019 – 2020: 6.5 million [<https://www.dli.pa.gov/Businesses/Workforce-Development/grants/Pages/PAsmartgrants2020.aspx>]

--- Early Childhood to construction trades to informational technology, mechatronics, cybersecurity

Recent Reports Recommend

Building Networks



Innovation · Openness · Equity

PAsmart Initiative: [<https://www.pasmart.gov/>] and [www.stem.pa.gov]

47 SCRIPT facilitators

157 SCRIPT Plans

1,300 educators in a continued CSforALL network network

Trained over 6,000 educators in CS

Building Resources



Innovation · Openness · Equity

CSinPA Supports (<https://www.pattan.net/Supports/STEM/computer-science>)

CS Teacher Toolkit

CS Administrators Toolkit

CS Family Toolkit

ACT 45 Administrative Leaders CS Experience

5th annual CSforALL Summit in collaboration with Counselors for Computing

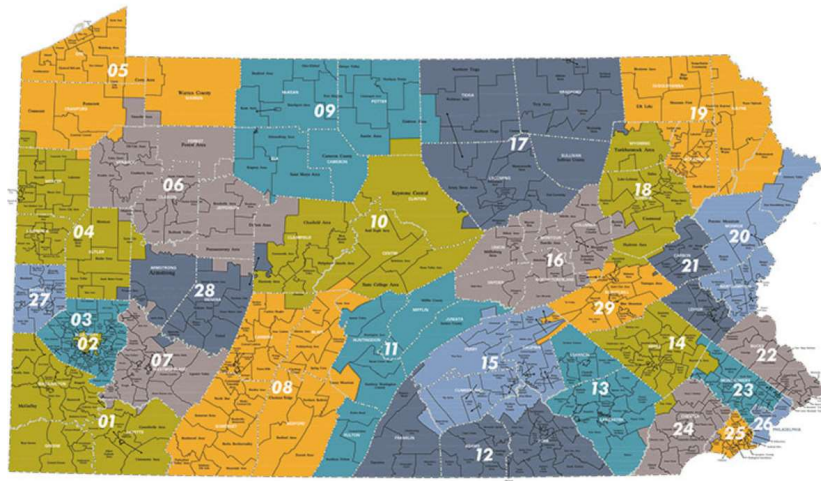
Building Resources



Innovation · Openness · Equity

CSinPA Supports through the PBS collaborative (<https://pennsylvaniapbs.org/digital/family-night-coding/>)

Building Networks



29 Intermediate Units:

29 IU STEM PoCs Went through the CMU CS Academy course as a learner and now is able to offer the training to LEAs

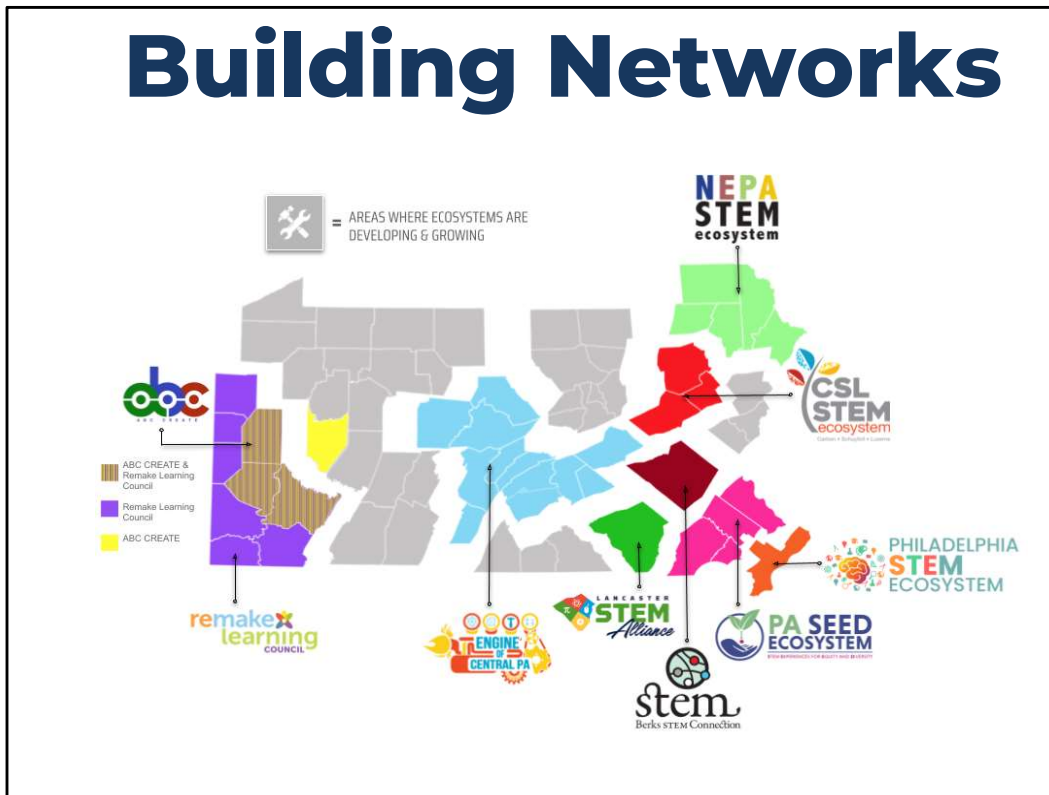
Each IU PoC has been trained to offer:

- K – 8 professional learning model
- 7 – 12 professional learning model

Has the opportunity to take the We_TEACH_Course as a learner and get certified in CS

Offered targeted grants to each of the IUs self run schools for students who emotional, social, and / or behavioral supports.

Building Networks



STEM Ecosystems Supporting the STEM Coalition building a relevant series of opportunities to connect with Stakeholders. These STEM leaders have formed the Pennsylvania Statewide STEM Ecosystem. (PSSE)

Talk about how many ecosystems we started with and where we are today.

What we've learned



1000% increase in the number of students enrolled in a CS course
271 % increase in the number of schools offering a CS course
63% of high schools are offering a computer science course

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Nostalgia: a sentimental longing or wistful affection for the past, typically for a period or place with happy personal associations.

A statement in the report: STEM Education for the Future

“we must examine the current academic structures and see if they best respond to the needs of current and future students”

Relationships matter and it is critical for the conditions in schools to foster strong relationships between students and between students and educators. This is the first and most critical step to accelerating academic learning and building those future proof skills.

Nostalgia is a strong emotion, we must not let this guide our directionality as we have a once in a generation opportunity to reimagine our educational spaces, who are included in our educational communities, where learning happens, how we deliver learning experiences. Lets not be nostalgic. If we dig into the past we will find systems that excluded learners from experiences, systems that excluded voices from the educational system, a system that has yet to truly enter the 21st century, and a system that is not setting the conditions for educators to best prepare learners to be creators in the 4th industrial revolution.

The importance reimagining the professional learning models:

- Smaller chunks over a long-term experience
- Synchronous and asynchronous options
- Building networks

What's Next?

#STEMinPA



#CSinPA

PAsmart Impact Report | Targeted and Advancing Grants

PAsmart Data Visualization Project | Cross Agency

PAsmart Apprenticeship Grants < <https://dced.pa.gov/programs/pre-apprentice-apprenticeship-grant-program/> >

Importance of setting the conditions for success through:

- Importance policy and program alignment.
- Importance of elevating career
- Importance of connecting formal and informal educators.

Reach out to take advantage of the free Computer Science professional learning, free WeTeach PRAXIS prep course, free tutoring, PRAXIS exam relief, filing fee relief

Build | Fly | Code Program | Focused on building Drone Education Pathways

- Focus on JROTC programs

TACTICS expansion with a focus on supporting the most vulnerable learners including by not limited to:

Migrant scholars

Blind and Visually impaired scholars
Hearing Impaired Scholars

#STEMinPA

Video

watch + share



Let's Connect!

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STEM.pa.gov



@PADeptOfEd

"To invent, you need a good imagination and a pile of junk." – Thomas Edison

"There are no rules here--we're trying to accomplish something." – Thomas Edison

"The most dangerous notion a young man can acquire is that there is no more room for originality." – Henry Ford

"The work of today is the history of tomorrow, and we are its makers." – Juliette Gordon Low, Founder of the American Girl Scouts