RESTORING
AMERICA'S POSITION AS A WORLD LEADER BY REINVESTING IN
STEM

January 2021

ACKNOWLEDGEMENTS

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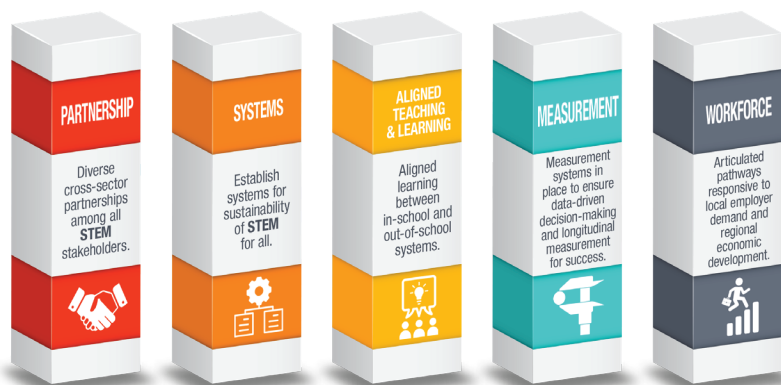*All 94 ecosystems within the STEM Learning Ecosystems Community of Practice*

SUMMARY

THE YEAR 2020 WAS UNLIKE ANYTHING WE'VE SEEN SINCE WWII AND THE SPANISH FLU. Economic and social devastation ripped through communities, leaving a wreckage, confusion and hopelessness that was compounded in some communities by floods, wildfires and hurricanes.

And then came an awakening to systemic racism that has permeated nearly all layers of society. As the lessons from 2020 continue to be inventoried and analyzed, at least one is eminently clear: Education must change.

We must have students capable of innovating and developing solutions to our grandest of challenges. Many communities that are faring the best are those with deep cross-sector partnerships and systems in place to mobilize learning and share and maximize resources. The STEM Learning Ecosystems Community of Practice, SLECoP, with 94 ecosystems in 37 states, stands as a singular, stellar example of how to form these partnerships and systems; and its leaders are eager to share their success as a model for leveraging STEM to strengthen our economy and ensure upward mobility for all.

More than 1,000 people who joined two Town Hall sessions and participated in other data collection efforts designed by the SLECoP and TIES during January 2021 urge the Biden-Harris administration to use the STEM Learning Ecosystems Community of Practice as a replicable model for collaboration, innovation and growth in STEM.

The SLECoP, which serves an estimated 40 million students, was envisioned during the end of the Clinton-Gore administration, launched during the Obama-Biden administration and singled out in the 2018 five-year federal STEM Strategic Plan plan as the top priority for STEM in the U.S.

PARTNERSHIP — Diverse cross-sector partnerships among all STEM stakeholders.

SYSTEMS — Establish systems for sustainability of STEM for all.

ALIGNED TEACHING & LEARNING — Aligned learning between in-school and out-of-school systems.

MEASUREMENT — Measurement systems in place to ensure data-driven decision-making and longitudinal measurement for success.

WORKFORCE — Articulated pathways responsive to local employer demand and regional economic development.

The SLECoP elevates STEM learning in communities by forging critical connections among business and industry, nonprofits and informal and formal educators for leveraging resources, sharing best practices and creating a culture in communities where STEM can thrive. Most of all, the SLECoP makes positive differences in the communities it serves and the families and learners who live there.

The STEM Learning Ecosystems has proven its ability to champion breakthroughs in learning and teaching and to challenge the status quo in education that has - for too long - accepted educational inequities.

In addition to facing these centuries-old educational inequities, the Biden-Harris administration will also be charged with addressing learning losses triggered by the pandemic and ensuring that young people master and advance in subjects while continuing to function in deeply challenging times. Families are navigating an increasingly competitive global landscape, where American students are falling behind. The time is now for the administration to pull communities together and forge pathways for economic prosperity and healthy communities.

"The incoming Biden-Harris Administration has a constellation of opportunities for restoring America's 'brand' as world leader in responsible innovation. Undergirding all of those opportunities will be to renew STEM education for broader inclusion and heightened mission across the nation. The best STEM education provides an interdisciplinary approach to learning where rigorous academic concepts are coupled with real-world applications connecting school, community, work, and the wider world. STEM is rapidly evolving from a convenient cluster of four overlapping disciplines to a vehicle for imparting not only skills such as inference, problem-solving, and design and critical thinking, but also behavioral competencies such as cooperation, perseverance, and responsibility. This is the vision laid out in "Charting a Course for Success: America's Strategy for STEM Education," a vision derived from the collective STEM education community to guide federal and national STEM education through 2023 and hopefully beyond."

- Jeff Weld, Ph.D.,
Executive Director of the Iowa
Governor's STEM Advisory Council

Investing in the infrastructure of the STEM Learning Ecosystems Community of Practice presents a unique opportunity to improve education, strengthen America's competitiveness, and enhance the quality of life for all Americans.

THE LEADERS OF THE STEM LEARNING ECOSYSTEMS BELIEVE THAT ITS COLLABORATIVE INITIATIVE OFFERS A POWERFUL WAY TO ADDRESS WHAT IT IDENTIFIED AS TOP PRIORITIES FOR THE NEXT ADMINISTRATION:

- Improving racial, gender and technological equity and access regarding STEM education.
- Creating stronger STEM career pipelines in communities.
- Eliminating barriers to early childhood STEM education.
- Leveraging STEM to improve lives and communities.

Those offering recommendations include STEM leaders, parents, students, educators, business and non-profit and government officials and representatives from philanthropic organizations. While participants are vastly diverse in their age, race, occupation and geography, they share a deep understanding of the power of STEM to improve lives and communities.

The group offered a comprehensive set of recommendations for how the Biden-Harris administration as well as federal agencies and state officials might actualize ideas to recover the lost ground of 2020.

The next administration must focus on using STEM to increase American competitiveness in the global economy, ensure bright futures for all young people, re-develop industries in cities with outdated economies, revitalize regions throughout the United States, ensure upward mobility in a growing workforce and secure access for those who have been left out of the STEM economy.

TOP RECOMMENDATIONS ARE:

- Foster collaboration to engage, leverage and link all relevant community resources - adoption of the STEM Learning Ecosystems model.

- Introduce a collaboratively-designed performance-based system to ensure quality and alignment with strong post-secondary and/or STEM careers.

- Support a diverse, well-prepared, and high-quality teaching workforce, and ensure their involvement and leadership with students, administrators and higher education faculty.

- Encourage long-term student participation in STEM by increasing its visibility, relevance, connections to the real-world and community and global challenges.

- Build a strong early learning system.

The following pages offer more detail about the recommendations, including stories and research illustrating needs and how they are being addressed - in part - through STEM Learning Ecosystems.

Finally, the STEM Learning Ecosystems Community of Practice is eager to assist with further discussion or actual development of any of the topics addressed in this report and has a full repository of additional examples and recommendations that could provide useful for further development of any of the recommendations.

OVERVIEW

In a Northeast Ohio community, students who live in one community can participate in robotics teams, after-school Chess and coding clubs, autonomous vehicle and rocket competitions and a plethora of other hands-on fun STEM activities - nearly every day.

Students who live only five miles away can sign up to go to a community center that is open from 3 p.m. to 8 p.m. Monday through Friday. Students receive an after-school snack and a warm and safe place to work on their homework. When their homework is done, they can play video games or basketball. Few other opportunities are available.

This example is played out across the country - Students from wealthy communities have a full range of fun and engaging options for how to engage in STEM while those from more economically challenged regions have little or no hands-on engagement opportunities.

This story and situation is one of many illustrating the huge disparities between how students in our country experience STEM. There are countless others.

Studies show that students living in communities of concentrated poverty have fewer STEM engagement options than their wealthier counterparts.

AFTERSCHOOL PROGRAMS NOT AVAILABLE IN LOWER INCOME COMMUNITIES

In a 2016 study, America After 3 p.m., reported that 42% of parents living in communities of concentrated poverty report that after-school programs were not available in their community compared to 28% of parents living outside of high-poverty areas.[1]

These disparities are not limited to out-of-school time STEM opportunities. There are also large gaps in STEM offerings in affluent and poor school districts.

SCHOOL DISTRICTS WITH LARGE POPULATIONS OF BLACK STUDENTS DON'T OFFER ADVANCED SCIENCE OR MATH COURSES

The Office for Civil Rights of the U.S. Department of Education reported in 2018 that schools with more than 75% of Black students are less likely to have advanced mathematics, Calculus and Physics.[2]

PERFORMANCE GAPS ATTRIBUTED TO OPPORTUNITY GAPS

Students of color consistently underperform their white counterparts in math and science standardized tests. High school science and mathematics courses provide students with the foundational knowledge and preparation for STEM careers as well as for STEM majors in college.[3]

The National Assessment of Educational Progress, NAEP, reports that Asian and white students significantly outperform Black, Hispanic and American Indian students on 8th grade math and science.[4]

FIGURE 4: Percentage of high schools offering mathematics and science courses

Legend:
- All high schools
- High schools with high black and Latino student enrollment
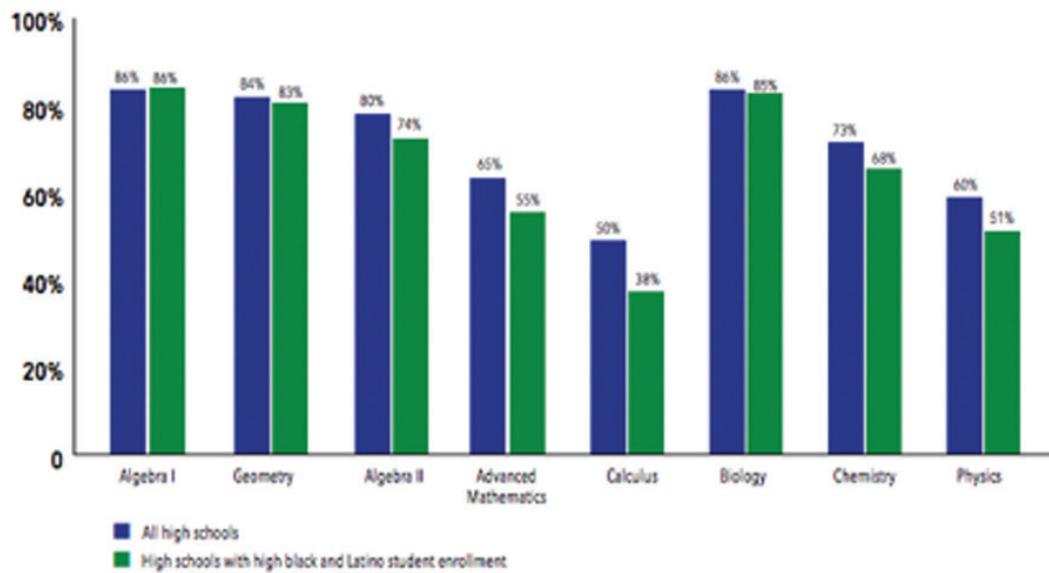
SOURCE: U.S. Department of Education, Office for Civil Rights, Civil Rights Data Collection, 2015–16.

GIRLS AND STUDENTS OF COLOR HUGELY UNDERREPRESENTED IN STEM PROFESSIONS

With students of color and girls not engaging in STEM at the same rates as their white male counterparts, it's no surprise that STEM professions as well as STEM courses of study are dominated by white men and that women and people of color are woefully under-represented.

In a study published by the National Academy of Sciences in 2018, researchers reported how high "school STEM course enrollment and success is one important focal point for increasing opportunities for the most disadvantaged students."[5] Students who enroll in biology, chemistry, and physics in high school, compared with students who complete fewer science courses, are three times more likely to meet college readiness standards for science.[6]

Researchers have concluded that students from lower-income backgrounds are much less likely to enroll in a full grouping of high school STEM courses, in large part, because of their poor performance in those courses as they begin high school,[7] and are less prepared for STEM careers than their counterparts from better resourced families and communities.[8]

BLACKS AND MINORITIES UNDERREPRESENTED IN BACHELOR AND ASSOCIATES DEGREES IN SCIENCE AND ENGINEERING

Data, including reports from the Pew Research Center, shows that whites hold a huge majority of all bachelor's degrees in science and engineering, with Blacks, Hispanics and American Indians/Alaska natives grossly underrepresented in science and engineering compared to their shares of the population.

Overall U.S. Workforce and STEM Workers in U.S.

Diversity in the STEM Workforce varies widely across jobs. Pew Research Center, 2018.
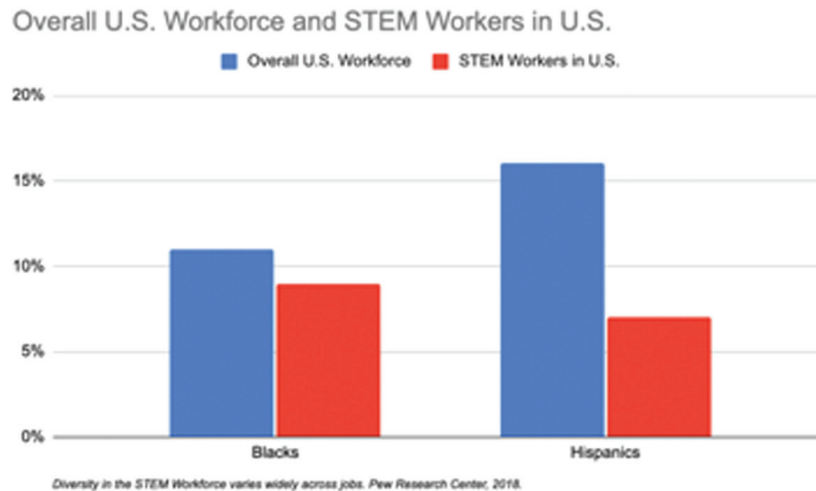
NAEP data also documents significant disparities in actual Science and Engineering workers as well as advanced degree holders. Blacks were 5% of all Science and Engineering workers but 12% of the working-age population.[9]

THESE GAPS AND OTHERS HAVE RESULTED IN LOST OPPORTUNITIES FOR INDIVIDUALS, BLOWS TO THE HEALTH OF COMMUNITIES AND THE OVERALL ECONOMY AND THE CONSEQUENCES WILL MOUNT FOR YEARS TO COME. FOR INSTANCE:

- STEM professions are projected to grow faster, provide greater earning potential, and produce lower rates of unemployment than non-STEM jobs over the next decade.[10] STEM training provides individuals with diverse and marketable skills which have utility across a variety of careers.

- The economy not only relies on STEM professionals but STEM understanding. Students can enter any profession strengthened with analytical reasoning and critical thinking skills . The National Academy of Sciences predicts that the current shortages are predicted to deliver a blow to the U.S. position as a global leader. The President's Council of Advisors on Science and Technology forecast in 2014 that there will be a shortage of 1 million STEM professionals over the next decade.

- The mindset that has fueled innovation and invention in our country relies on people who have STEM mindsets and training. The next generation of inventors and innovators must be ready to lead with the proper training.

STEM LEARNING ECOSYSTEMS COMMUNITY OF PRACTICE

The STEM Learning Ecosystems Community of Practice - a 6-year-old movement of 94 ecosystems touching more than 40 million students - unites diverse partners to work for shared goals and gains for STEM access and opportunity for all, with an understanding that STEM is a mindset and construct to innovate and solve society's biggest challenges and strengthen the economy.

The STEM Learning Ecosystems operates with a fundamental understanding that it takes an entire community to make serious and lasting gains for students and communities. No single entity can do it alone. Schools and parents need business and industry, government, out-of-school providers and non-profit partners all at the table, making decisions and creating meaningful opportunities for students.

The work of each ecosystem varies with some serving as "connectors" and "disseminators" and others as actual program operators. The common trait of all is a deep understanding of the power of STEM and the strength of uniting diverse partners to drive action.

Great Lakes Bay Region
Where Innovation Flows

The Great Lakes Bay Regional Alliance an ecosystem serving eight counties in Michigan, views its role broadly and has adopted aggressive initiatives to help improve STEM opportunities for all.

From assembling partners to help create and distribute personal protective equipment in the early days of the pandemic, to working on STEM literacy for preschool students, the ecosystem is well-entrenched in its communities. It is now helping lead COVID-19 vaccination distribution efforts.

remake learning

Remake Learning, also known as the Pittsburgh Regional STEM Ecosystem, views its role as the STEM coordinator and communicator for its region of Pennsylvania. With a proactive approach to the need for strong communications, the leaders of this Ecosystem regularly engage neighborhood and community based leaders to disseminate important information about STEM learning with their constituents.

Remake Learning has a strong focus on equity and heavily leverages community expertise to ensure all students and families have access to opportunities.

RECOMMENDATIONS:

More than 1,000 education, business and community leaders, parents, students and others from across the country were asked to provide policy suggestions to improve STEM learning in the United States.

It is important to note that the following recommendations assume that access to broadband Internet, especially in rural areas, has already been noted by the administration and the various federal and state agencies in a position to address this equity issue.

THE STEM LEARNING ECOSYSTEMS COMMUNITY OF PRACTICE WAS ASKED TO BRAINSTORM STRATEGIES THAT WOULD ELIMINATE BARRIERS AND OFFER OPPORTUNITIES IN THE FOLLOWING AREAS:

- The general advancement of state, regional and local STEM priorities, including access to high quality STEM learning and strong STEM career pipelines;
- Greater equity and access to STEM learning and career opportunities with emphasis on racial, gender, location, socio-economic status, age, and ability (a strong emphasis was placed on racial equity); and
- The advancement of an early childhood education system to produce the foundation for learning.

Members offered specific recommendations tailored for each of the areas, but significant overlap emerged and offered a big picture blueprint of how the Biden-Harris administration, federal agencies and state officials could deliver monumental improvements to the current education system.

The following recommendations offer relevant and equitable learning experiences for young people that will yield a population of critical thinkers and problem-solvers necessary for thriving communities and a vibrant national economy.

Leaders throughout the United States have concluded that no single organization or entity could or should be responsible for leading STEM for their communities. They recognized that STEM has unlimited power to transform the trajectories of communities and the lives of individuals. STEM Learning Ecosystems are formed to launch cross-sector collaborations to transform communities while charting powerful learning and career pathways for all. The current needs as well as those of the future for business and industry must be carefully mapped and integrated with all other sectors, including formal and informal learning settings.

A 2018 Federal report by the Office of Science and Technology Policy ranked developing and sustaining STEM Ecosystems as the top priority for how to improve STEM in communities.[11]

The two major value propositions of STEM Ecosystems are their ability to provide the mechanisms for building stronger communities and economies and their power to engage residents.

Tulsa Regional STEM Alliance

Partnership to Transform STEM Learning
A CASE STUDY OF TULSA, OKLAHOMA'S ECOSYSTEM

"The STEM Learning Ecosystem Community of Practice is a game changer thanks to the unique position of ecosystems as neutral conveners - existing to optimize the impact of the work in STEM education in both formal and informal settings. STEM Ecosystems serve as powerful force multipliers as they nimbly foster collaboration, nurture innovation, advance emerging best practices in the field and measure the impact of the work so that students and educators around the world have access to high-quality, trajectory changing STEM experiences."

- Xan Black, Director,
Tulsa Regional STEM Alliance

HERE'S HOW:

Ecosystems bring together partners from nearly all sectors in a community to align learning, harness resources and plan for the future. Partners from K-12 education, early learning, higher education, business and industry, religious organizations, government, out-of-school, non-profits, philanthropy and others all come together to identify needs, opportunities, resources and goals. It doesn't stop with just conversation. Ecosystems go to work implementing action plans with clear priorities, resources and a collective vision.

Stakeholder Participation and Impact Levels

INFORM
Providing balanced and objective information to stakeholders on audit topic and results

CONSULT
Obtaining feedback from stakeholders on issues raised during audit and alternatives to solve them

INVOLVE
Ensuring stakeholder concerns and opinions are reflected in audit reports and providing feedback on how input was considered

COLLABORATE
Collaborating with stakeholders in decision making and identifying preferred solutions

EMPOWER
Final decision making delegated to stakeholders

STEM ecosystems

ROADMAPS FOR FAMILIES AND THEIR CHILDREN TO FOLLOW TO IMPROVE THEIR LIVES

Alignment of many different systems within a community.

greater milwaukee
STEM
Inclusive. Equitable. Empowering.

"I was given exposure to STEM in middle school to inform my academic and career plan, connected with co-curricular and post-secondary opportunities to explore and refine my interests, supported by adult mentors to give me confidence, and provided with opportunities to build a professional and peer network that has helped me persist in Computer Science. This support has been life-changing. All students should have this experience."

— Megan Choy, GM-STEM alumni Milwaukee, WI

This provides a sustainable, seamless formal and informal cradle-to-career educational system that encompasses the unique needs and offerings of early childhood, K-12, higher education, career and technical education, out-of-school and business and industry.

This alignment ensures students can easily travel well-prepared from one area to the next, without incurring major barriers, roadblocks or distractions and with needed STEM identities that will allow smooth journeys.

Alignment of different sectors keeps random learning to a minimum and, instead, creates systematic, meaningful and measurable educational progressions for students.[12] This allows community partners to leverage each other's strengths and deploy resources in more meaningful ways for full maximization (e.g. organizations don't need to compete for funding if they can leverage the strength of another community partner).

FAMILY ENGAGEMENT

Ecosystems have developed a strong set of best practices for engaging families in the education of their children.

A national survey by the Education Development Center shows that 99 percent of parents want to be involved in their child's education, but they don't know how.[13] Most parents also reported not feeling confident or capable to help their children in science, primarily due to their own lack of science knowledge. Ecosystem parents often work together to support families to gain confidence to support their students with math, literacy and science skills.

Research shows that children are more likely to excel in school and stay on track to college and/or careers when families and schools work together to support a child's learning.[14]

Additionally, families are critical to ensuring that students become excited about and stay inspired to learn STEM. For example, studies show that familial support significantly impacts a young woman's decision to pursue computer science.[15]

Educating families gives them necessary information about career options for their child.

CHICAGO
STEM
Pathways Cooperative

"Family engagement in STEM is necessary to develop STEM-rich homes and STEM identities in children. Family engagement strengthens STEM learning by building a foundation and nurturing children interest in STEM activities across a variety of settings."

— Natasha Smith-Walker, Executive Director, Project Lead the Way and Ecosystem Leader of the Chicago STEM Pathways Cooperative

NEOSTEM ECO
Northeast Ohio **STEM** Ecosystem

WIR'ED

Days after businesses in Ohio had to shut down in March 2020 because of the COVID-19 pandemic, the NeoSTEM Ecosystem seized an opportunity to provide valuable service to the businesses while providing a unique learning and earning opportunity for students.

Wir'ED formed to help businesses in the Cleveland area who have only a brick-and-mortar presence by partnering them with students with technical skills to create an online presence.

With coordination from the NeoSTEM Ecosystem and support from business, educational and philanthropic sector partners, the first pilot of WIR'ED launched in March 2020 with 10 students and eight businesses. Students were paid $500.

Students taught business owners to build Google sites, Facebook pages and manage email. Some constructed websites.
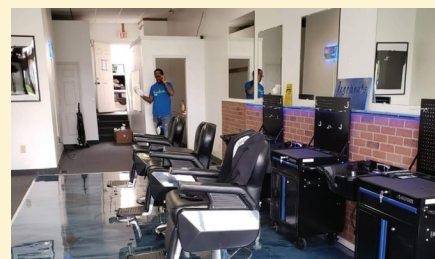
A second pilot will launch in February 2021 with 20 students and 10 businesses.

"We saw a huge need. Students were not attending online classes because they had to go out and get jobs to help support their families. At the same time, businesses were suffering because they had little or no online presence," said Alyssa Lenhoff-Briggs, director of the NeoSTEM Ecosystem.

One Wir'ED student observed, "This was the first time that anyone has ever asked me to teach them anything. It felt great."
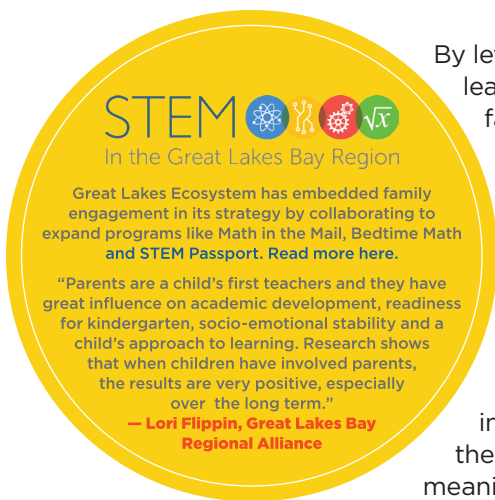
By leveraging the larger community as a learning vehicle, opportunities to engage families around STEM can happen anywhere - in parks, laundromats, doctor's offices and grocery stores.

The recommendations appearing on the following pages are the thoughts of leaders of the STEM Learning Ecosystems Community of Practice who believe that the SLECoP can be a useful vehicle for developing, piloting and scaling possible solutions to sustain and grow the economy and give all learners access to meaningful STEM.

EMPOWERED RESIDENTS FOR AN UNDERSTANDING OF COMMUNITY NEEDS AND ENTHUSIASM FOR STEM

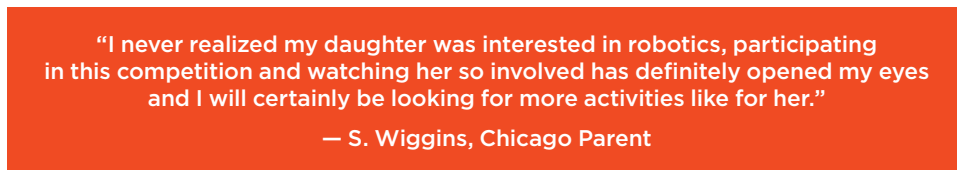Ecosystems enable students and families to understand how to engage in STEM educational pathways and the economy. Ecosystems support this empowerment by listening to communities and uncovering needs and solutions for learning and career pathways and then designing and implementing responsive solutions that are accessible to all.

This listening is critical and important to leverage programs that allow students to be a part of the STEM conversation. Chief Science Officers initiative.

Because they take a broad, holistic view of community assets and needs, ecosystems bring together a wide collection of resources for improved and relevant learning. By engaging in "match-making," partners help identify resources that enrich learning opportunities for all students and can elevate learning possibilities and resources.

Ecosystem stakeholders explain what they need in terms of staffing or resources and also what they have to offer, enabling a comprehensive matching and planning process. This type of feedback can result in a variety of changes that reduce barriers for educators and other partners.

SYSTEMS AND PLANS FOR COMMUNITIES TO BUILD AND STRENGTHEN ECONOMIES WITH STEM NEEDS CLEARLY IDENTIFIED AND CHARTED

Ecosystems also empower residents by supporting existing community networks and councils that may already include needed stakeholders and learning from their experiences and knowledge for how to best grow the economy.

Ecosystems are in a unique position to support a local supply chain of needed talent and other resources. This was magnified during the COVID-19 pandemic where ecosystems stepped up to play critical roles in the creation or distribution of needed resources.

INTRODUCE A PERFORMANCE-BASED, COLLABORATIVELY DESIGNED SYSTEM TO ENSURE QUALITY AND ALIGNMENT TO STRONG POSTSECONDARY AND/OR STEM CAREERS

Standardized testing is not producing results that support the true understanding of a student's mastery of a subject. Standardized testing, instead, produces a comparison of how students are doing in relation to their national peers.[16] These tests don't provide accurate enough pictures of students' strengths and weaknesses to determine any underlying academic issues or deficiencies.

The United States has increased its focus on standardized testing of students over the years, however, the U.S. has not made any significant improvement in major subjects like math in the international arena. In October 2019, PISA results found that achievement results have not progressed in a decade.[17]

Test results create the illusion of an "achievement gap," which is actually an "opportunity gap." Standardized tests are typically embedded with racial, socio-economic and cultural biases. Language and concepts included often are geared towards white, upper-middle class students, even if not deliberate.[18]

Stereotypes based on gender and race also influence stress and anxiety many students feel when taking their tests. "Stereotype threats" become most relevant for students during performance evaluations; therefore, making standard testing periods a period of heightened stress.[19]

As one of the ways of addressing this recommendation, the SLECoP can foster a system for developing, testing and sharing best practices regarding assessment practices. Ecosystems' biggest value proposition in this area is the ability to bring together diverse stakeholders to reach common goals. This might include bringing schools, businesses, out-of-school institutions, government and other community-based organizations to develop a clear picture of the skills graduates need in order to be successful in the current and growing STEM economy.

In order to further scale best practices, the global SLECoP could share insights on how other regions are tackling this issue. This might include discussions about standardized testing, gathering of research and aligning leading thinkers in the field to develop recommendations complete with experiential data and descriptions that move away from traditional measures while incorporating growth mindset strategies. These recommendations would be holistic in their evaluation of students' mastery of skills and would likely include portfolio-type demonstrations of work.

Nearly three decades of academic standards coupled with a high stakes testing accountability model have failed to significantly narrow the achievement gap in STEM for underrepresented students. Students of color and students impacted by poverty still perform poorly in comparison with their peers. South Carolina's STEM Learning Ecosystem believes it is time to rethink this model and supports efforts by our State Department of Education to bring the know-how to implement learner centered, competency based instructional and assessment practices into schools across our state."

- Thomas T. Peters, Ed.D., Executive Director, South Carolina Coalition for Mathematics & Science

STEM ecosystems

South Carolina's Profile of a SC Graduate, identifies knowledge, skills and characteristics for success in college and careers. The Department of Education, working with a cohort of school and district-based "fellows" is exploring ways to align **academic standards, competencies** and assessments toward a more comprehensive approach to demonstrating student learning.

SUPPORT A DIVERSE, WELL-PREPARED, AND HIGH-QUALITY TEACHING WORKFORCE, AND ENSURE THEIR INVOLVEMENT AND LEADERSHIP WITH STUDENTS, ADMINISTRATORS AND HIGHER EDUCATION FACULTY

The United States is in crisis regarding teacher recruitment and retention, especially in subjects connected to science and math. A strong focus on teacher recruitment and retention, with emphasis on a diverse workforce, is critical to ensure the nation's successful future.

Studies show that achievement for students of color increases significantly when they have at least one teacher of the same race. Research has reported that same student-teacher matches results in reduced rates of student chronic absenteeism and stronger academic engagement and success.[20] Simply stated, teachers should look like the diverse populations they serve.

SEVERAL STATES HAVE DEVELOPED RECRUITMENT AND RETENTION STRATEGIES FOR DIVERSE TEACHERS:

COLORADO developed recommendations that include recognition of the importance of relationships between educational institutions and minority communities.

CONNECTICUT extended eligibility for the teacher mortgage assistance program for teachers who graduated from an educational reform district or a historically black college or Hispanic-serving institution.

NEW MEXICO changed the state's teacher loan repayment program to prioritize those teaching in designated high-need areas, including teachers who are minorities. The bill also established a scholarship program for minority students.

WISCONSIN expanded the Minority Teacher Loan Program so that a recipient is required to be employed at a school in a district where students of color constitute at least 40% of the district's membership.

An emphasis on building a professional teaching force that has mastered the ability to teach STEM skills has become more critical today with a near-constant stream of technological advances defining our economy. Countless professions of today didn't exist 10 years ago and it's become clear that it's no longer acceptable to prepare students for specific jobs or careers and instead, students must be taught how to think and to embrace STEM mindsets. STEM learning deepens students' critical thinking and analytical skills helping them be better prepared for all professions.

The SLECoP can foster a system for recruiting, training and retaining a high-quality and diverse teacher workforce, building formalized partnerships with others who are working in this space, including 100K in 10. Ecosystems can also build strong partnerships within their regions to support the recruitment, training and professional development of educators.

This might look like creating incentives at state and local levels for new professionals to enter the teaching field, training aligned with local business and industry partners to expose teachers in the classroom with skills needed in the current economy, and other means to connect schools with meaningful professional development opportunities.

In rural communities, access to quality professional development can be an issue. Solutions like North Dakota Rural Education Cooperatives help teachers with developing STEM strategies and bringing people in from industry.

LANCASTER COUNTY STEM ALLIANCE SUMMER EXTERNSHIP EXPERIENCE

As part of its strategic priority of bringing business and education closer, the Lancaster County STEM Alliance has worked with several local employers for the past 4 years to offer 50 – 75 educators each year an intensive, 3-day summer externship experience. Throughout their lives, most educators have experienced only one work setting – a school. As communities look to educators to help prepare young people for the world of work, it is imperative that educators have first-hand experience.

Each year, the focus of the externship experience is two-fold: 1) to have educators do the tasks associated with specific high-demand careers, and 2) to provide educators with turn-key lesson plans to simulate these experiences in the classroom. STEM Alliance staff work closely with company personnel for several months to design hands-on learning experiences that demonstrate, rather than explain, how STEM learning is applied to an authentic workplace problem. Overwhelmingly, educators find these experiences beneficial. As one educator stated, "This is the best inservice activity in my 20 years of teaching!"

Business partners also welcome these opportunities to help local educators better understand the world of work. With the help of the STEM Alliance, a workplace typically dedicates hundreds of hours of staff time to co-planning and executing these summer externship experiences. "It's a way of investing in their future workforce," noted Robert Krasne, Chair of the Lancaster County STEM Alliance.

It's a simple truth that students won't enter a STEM profession if they have no understanding of what it is, no connection to a STEM professional, no meaningful engagement with STEM and no reason to believe that people who look like them can be successful in such professions. Furthermore, STEM strengthens students' critical thinking, reasoning and analytical skills helping better prepare them for all professions.

THESE INESCAPABLE FACTS OFFER A POWERFUL ROADMAP FOR CHARTING REAL GAINS IN STUDENT PARTICIPATION IN STEM. ACCORDINGLY, NUMEROUS ECOSYSTEMS HAVE LAUNCHED INITIATIVES THAT:

- Explain STEM careers and offer attainable pathways to begin pursuing them;
- Introduce STEM professionals and professions to learners and their families through mentorship programs and other initiatives; and
- Elevate the visibility of STEM professionals of color and women.

Underlying the effectiveness of each of the outreach pathways is a need to engage families along with other key stakeholders. In a 2020 study, a group of CEOs concluded that the best way to prepare for the workforce needs of the future is to engage, collaborate with and create an ever-adjustable pipeline with "parents, educators and schools, industry and community partners, and government as key players."[21]

Learning opportunities must also incorporate real-world lessons and be designed with hands-on activities to ensure maximum engagement.

By aligning learning to the real-world, we will produce the next generation of highly skilled workers, as well as innovators for good.

HERE'S HOW:

"The proven impact of STEM education can be seen across the state in the growth of innovative, hands-on, place-based learning that is inspiring and engaging students," said Stefan Bird, Council chair and president and CEO of Pacific Power. "The STEM Plan aims to accelerate the availability of these opportunities for all Oregonians so students have the STEM skills required for equitable access to the high-wage and high-demand jobs of the future."

— Stefan Bird – Chair, Oregon STEM Council and President and CEO of Pacific Power

The World Economic Forum estimates that 65 percent of children entering primary school today will end up working in completely new jobs that don't exist yet.[22] This means that our education system must teach students fundamental skills that will allow them to work in careers that have not even been created or defined yet.

FOCUS ON TEACHING STEM SKILLS THROUGH DIVERSE SET OF MEDIUMS AND BY INVITING EXTERNAL COMMUNITY PARTNERS INTO THE PROCESS

STEM skills require students to think critically, to ask questions and find solutions, to collaborate with peers and to fail gracefully in the name of learning. Students who excel in STEM are the students who will lead the economy of tomorrow and become the next innovators of our nation.

OREGON CONNECTIONS

"As a global talent acquisition director at Intel, the largest private employer in Oregon, I see [remote learning due to COVID-19] as a huge opportunity for Oregon's students to accelerate their growth of soft skills that many employers are looking for in their future workforce. This includes problem-solving, critical thinking, adaptability, innovation and design thinking. While online learning resources are our best tool for keeping students on track academically, these virtual learning environments are not built to teach skills like adaptability and design thinking. Often, when we look at leadership development, we consider the 70-20-10 model, where 70 percent of a leader learning comes from application — actually doing the work and applying it to their environment — and this is what is missing through online learning. My work on the STEM Investment Council has shown me that one proven system for teaching these soft skills, and applying them, is through STEM education." Nikki Salenger – Intel, 2020

In Oregon, several of the statewide Ecosystem hubs are implementing hands-on learning experiences through career and technical education (CTE) programs. The Northwest STEM Hub has been working with community partners to establish region-wide, paid internship and Career Connected Learning opportunities for youth in each of the three counties we serve. In Columbia County, Oregon, collaborating with the local school districts, community college, and industry partners, we have a unique opportunity to partner with the Oregon Manufacturing Innovation Center (OMIC), located in Scappoose, Or-

egon. In preparation for the development of OMIC, we began building K-12 programs that align with OMIC-related skill sets in advanced manufacturing. This involved building a middle school level STEM elective course that aligned with the high school CTE manufacturing, engineering, and design courses. Last year, we were able to place 9 local high school students in paid internships at OMIC R&D, where the students were able to apply the STEM and CTE skills that they have honed in throughout the past four years. We are continuing to connect our K-12 partners with industry to demonstrate how STEM and CTE skills are applied beyond the classroom.

The Umpqua Valley STEAM Hub in Oregon is working with students to develop community-based STEAM career projects to be presented during their STEAM week. This project is inclusive of all students, including students who are home-schooled.

Through Oregon Connections, the Ecosystem is making greater community connections to promote local industries including healthcare, the trades, manufacturing/technology, natural resources and education, based on student and community priorities.

The Ecosystem is also working on the re--engaging youth who have left school and are not working. They have prioritized supporting them to finish high school or get GED, as well as create a meaningful career plan for the future, as part of a recent grant award.

ALLOWING CHILDREN TO ENVISION THEIR FUTURE BY SEEING IT IN ACTION

Research continues to show that a positive STEM identity strongly influences a child's decision to pursue STEM in education and career. In fact, no matter how exciting a learning experience might be, if a student can't envision themselves in a future career role they will be less likely to continue preparing for the career.[23]

Mentorship is particularly important in our ability to diversify the workforce to include more people of color and women, who remain drastically underrepresented in the STEM talent pools.

"Mentors are there to help their mentees to tread a path without having to make the same mistakes and to have a sounding board to bounce ideas and plans off of. Mentors and role models provide examples of the impossible being possible when you really can't visualize it any other way."

In addition to her work mentoring students, Dr. Horton has also been working with Chevron: Fueling Math, a community building awareness project launched with two ecosystems in New Orleans intended to raise the public's understanding of the importance of middle school math. Dr. Horton appears on a billboard in Louisiana and is one of the many volunteers joining a virtual math mentorship and coaching program developed by TIES with support from Chevron, STEM NOLA and Northshore STEM Coalition.

— Renee Horton, PhD - System Quality Engineer for NASA and a frequent mentor for young women

KEEPING ALL STUDENTS ENGAGED WITH EXPERIENTIAL LEARNING

Countless studies have validated an approach to learning that integrates real-world and hands-on learning as opposed to standard textbook or lecture methods. Many Contextualized teaching and learning (CTL) opportunities have emerged in STEM disciplines as effective methods for engaging learners who might otherwise not excel.[24]

Individual ecosystems have been quick to embrace CTL and other experiential learning opportunities and embed them in their work. This allows ecosystems to not only develop deep and meaningful connections to the workforce, but also ensure that the ecosystem is at the forefront of understanding workforce needs, including many of the "soft skills" that are so critical for success.

This learning must also be aligned with out-of-school learning opportunities. This presents as the most likely way that true gains will be realized with attracting and retaining students in STEM. The out-of-school time sector has become a leading provider of STEM enrichment"[25] offering learners rich, engaging learning experiences while pairing STEM concepts with hands-on activities that foster youth voice and choice. Significant research has documented the positive effects of out-of-school STEM on youth outcomes.[26] The partnerships between STEM professionals, out-of-school providers, K-12 schools, higher education and community organizations has been shown to improve access to quality STEM learning, especially among underserved youth, and to increase the number of young people who pursue STEM careers.[27]

"LET'S MAKE EDUCATION INTERESTING AND FUN AGAIN. IT HAS BEEN MY EXPERIENCE THAT MY STUDENTS LEARN MORE BY DIRECT COLLABORATION WITH OTHERS AND REALLY APPRECIATE WHEN THEY CAN WORK ON A PROJECT THAT HAS IMPLICATIONS FROM THEIR ACTIONS. IF WE HAVE LEARNED SOMETHING THROUGHOUT THE PANDEMIC IS THAT EDUCATION, PUBLIC HEALTH AND SOCIAL JUSTICE ARE INTRINSICALLY CONNECTED, SOMETHING WE SEE VERY CLEARLY HERE IN PHILADELPHIA. I WOULD LIKE TO GIVE OTHER STUDENTS THE OPPORTUNITY TO STUDY AND WORK ON REAL-LIFE ISSUES THAT ARE IMPORTANT TO THEM. THE PHILADELPHIA STEM ECOSYSTEM HAS BEEN SUCCESSFUL IN CONNECTING PARTNERS IN PROJECTS THAT GO BEYOND OUR AREA, BUT IT SHOULD BE A GIVEN THAT COLLABORATIONS BETWEEN SCHOOLS, INDUSTRY, STUDENTS, AND OTHER STAKEHOLDERS BE AVAILABLE TO ALL STUDENTS AROUND THE NATION."

— Betsy Payne, Manager, Philadelphia STEM Ecosystem, Philadelphia Education Fund

Learning during out of school time not only increases the ability for students to participate in more experiential learning, but also helps to eliminate the achievement gap. After school programs give students more time to understand complex subjects by increasing their amount of learning time. Many programs extend later into the afternoon and offer meals, which supports working and low-income families as well.[28]

We have personally witnessed preschoolers learning chromatography using a coffee filter. This has sparked our 4-year-old to frequently ask to do science projects with food coloring at home. Through the Girls Who Code program, we have seen elementary students coding, testing, and debugging robots to perform automated tasks. The best part is that the students are excited about what they are learning. This is how we harness more innovation and discovery in our society.

— Jeff and Sarah Bradford, Parents and Gateway to Science Members, North Dakota STEM Ecosystem

BUILD A STRONG EARLY LEARNING SYSTEM

One in three students are not prepared for kindergarten.[29] This learning gap only compounds over students' lifetimes as those who miss early learning opportunities are less likely to catch up to their peers and identify themselves as strong learners. Lack of exposure to and engagement with STEM in early learning settings also offers lasting ramifications with those who have not engaged in early STEM being unlikely to find engagement with it later in their academic careers.

Furthermore, early math offers strong and critical preparation for later academic success and, in fact, is the strongest predictor of later academic preparedness, ability to pay attention and socioemotional skills for students in later years.[30]

Early STEM exposure also helps ensure family engagement in learning, increasing the likelihood that students will develop STEM identities and pursue such disciplines in the future.[31]

"In fact, just as the industrial revolution made it necessary for all children to learn and read, the technology revolution has made it critical for all children to understand STEM." The following quotation from the STEM Starts Early report by the Joan Ganz Cooney Center at Sesame Workshop, highlights the importance of STEM literacy in students to ensure American citizens are prepared for the digital economy:

"DEVELOPING A NATIONAL EARLY LEARNING SYSTEM AS PART OF OUR EARLY CHILDHOOD EDUCATION STRATEGY. WE HAVE THE RESEARCH, POLICY KNOWLEDGE, AND PRACTICE, PARTICULARLY IN STEM, THAT WOULD ALLOW ALL STUDENTS - REGARDLESS OF THEIR FAMILY'S MEANS OR ZIP CODE - TO PARTICIPATE AND FLOURISH"
— **Andrés Henríquez, VP of STEM Learning in Communities, New York Hall of Science**

In partnership with the City of New York, the New York Hall of Science (NYSCI) is building a STEAM-focused preschool on the museum's campus, which will open in the fall of 2022. The school, designed to serve up to 340 four-year-olds who live in NYSCI's neighboring community of Corona, Queens, embodies a new model of partnership, leveraging NYSCI's expertise and esources to ensure that students and families have access to high-quality STEM learning experiences. In this unique partnership, NYSCI will host and support the school, infusing the museum's distinctive Design, Make, Play approach to learning throughout.

The bottom line is that STEM must start early. The earlier foundations are created for students to get excited about learning, the more inquisitive and successful they will be, thus fueling their learning journeys into careers.

HERE'S HOW TO ENSURE EARLY STEM CAN BE INTEGRATED INTO COMMUNITIES:

PREPARE A WORKFORCE OF EARLY LEARNING EDUCATORS EQUIPPED WITH THE SKILLS AND SUPPORTS NECESSARY TO DEVELOP YOUNG CHILDREN'S STEM SKILLS

In order to accomplish this, we must develop a comprehensive system of early childhood STEM teacher preparation programs at local levels. With federal guidelines, financial support, resources for implementation and incentives to keep the work progressing. This includes more funding for critical programs such as Head Start.

"IF THERE IS ANYTHING THAT WE'VE LEARNED DURING THIS PANDEMIC IS THE IMPORTANCE OF A WORKFORCE THAT CAN SUPPORT OUR CHILDREN'S LEARNING."
— **Andrés Henríquez, VP of STEM Learning in Communities, New York Hall of Science (NYSCI)**

IN PARTNERSHIP WITH BANK STREET COLLEGE OF EDUCATION, NYSCI IS PILOTING THE ACTIVE STEM LEARNING IN THE EARLY CHILDHOOD CLASSROOM PROGRAM. IT FOCUSES ON THE PROFESSIONAL DEVELOPMENT OF EARLY LEARNING PROFESSIONALS AND INCORPORATES THE FOLLOWING THREE KEY AREAS:

- Recognizing STEM Learning in the Everyday
- New Ideas for Familiar Materials
- Increased Collaborations at Multiple Levels

In New Orleans, the Louisiana Children's Museum (LCM) exposes early childhood educators to STEM best practices. LCM uses field trip opportunities to have expert staff early childhood STEM education practices to early childhood educators, who are often under-trained or under-exposed to STEM.

> **"It's important to show children and adults that it is okay not to know the answer,"**
> says Emily Barnitz, Louisiana Children's Museum

Additionally, comprehensive and recognized curricula, complete with recognized hands-on learning opportunities can be scaled to guide organizations on the ground with implementation. This includes tool-kits focused on teaching the processes of STEM through play and tinkering (for example, Engineering is Elementary).

Beginning to infuse STEM skills through hands-on learning will allow our earliest learners to develop the foundational skills that will make them successful in the future.

> "PROVIDING ALL CHILDREN WITH HIGH-QUALITY STEM TEACHING AND LEARNING IS ESSENTIAL IF WE ARE TO PREPARE AND INSPIRE MORE STUDENTS, PARTICULARLY THOSE OF COLOR AND GIRLS, TO PURSUE STEM AS AN EDUCATION AND CAREER PATH. WE MUST START AS EARLY AS ELEMENTARY SCHOOL, IF NOT BEFORE, TO BUILD A STRONG FOUNDATION FOR STEM LEARNING. IT SHOULD BE PART OF THE CORE CURRICULUM AND INTEGRATED THROUGHOUT INSTRUCTION SO ALL KIDS ACHIEVE PROFICIENCY IN STEM SUBJECTS AND ACQUIRE THE CRITICAL THINKING AND PROBLEMS-SOLVING SKILLS THEY WILL NEED TO SUCCEED IN THE FUTURE. THIS IS EXACTLY WHAT THE CALIFORNIA STEM NETWORK AND BAY AREA STEM ECOSYSTEM ARE ADVOCATING FOR THROUGH THEIR EFFORTS STATEWIDE AND REGIONALLY."
>
> **— Vincent Stewart, Executive Director, California STEM Network**

CULTIVATE FAMILY AND COMMUNITY SUPPORT STRUCTURES TO ENCOURAGE AND DEEPEN STEM LEARNING ACROSS DIFFERENT ENVIRONMENTS

STEM Learning Ecosystems cultivate strong collaborations across sectors, including those not traditionally considered education entities. By working with community partners like museums, parks and even doctor offices, learning with young people can happen anywhere.

STEM Learning Ecosystems have created opportunities, through community partnerships, to support families in the development of their young children no matter the environment.

STEM In the Great Lakes Bay Region

Great Lakes Bay Regional STEM Alliance's Math in the Mail program creates opportunities for families to learn math, in engaging ways, in the comfort of their own homes.

In Ventura County, the Ecosystem has scaled strategies that have strengthened relationships between families and educators. Through deep family engagement, the VC STEM Network has encouraged families to continue the learning with their children wherever they are. Read more here.

¡explora!

In New Mexico, the Ecosystem's backbone organization, Explora, uses play in the museum setting to 'hook' early learners with STEM fundamentals. The learning center setting makes STEM much more approachable for families, helping build confidence. Read more here.

"We're not teaching STEM in the same way that STEM is being taught in the school. We are adding to what a young child and a young parent knows and understands about the subject. And it is just these added cognitive hooks. And it's how you facilitate that experience that will create that cognitive hook tha will last throughout a lifetime."

— Allison Brody, STEM-NM Ecosystem lead

KNOCK KNOCK children's museum

The Knock Knock Children's Museum in Louisiana ensures their space supports learners and their families no matter their level of understanding. By creating spaces for tinkering, making and engineering the museum promotes STEM learning.

Tinkering allows students to play with different items, explore its physical properties and determine how it works. Making has an end product in mind, with early learning creating a specific product. Engineering uses items to make things to solve problems.

CONCLUSION

TOP RECOMMENDATIONS OUTLINED IN THIS REPORT HAVE BEEN GENERATED THROUGH CONVERSATIONS WITH HUNDREDS OF STEM LEADERS WORKING IN COMMUNITIES THROUGHOUT THE UNITED STATES. These leaders have been on the ground for years and are regular contributors to the STEM Learning Ecosystems Community of Practice.

The STEM Learning Ecosystems Community of Practice holds a national network of STEM professionals working in early learning, K-12, post-secondary institutions, businesses, community-based organizations, government and more.

Our ability to mobilize thoughtful leaders, working on the ground within communities, is significant. The STEM Learning Ecosystems Community of Practice will continue to support communities with resources and tools to elevate STEM and to implement recommendations developed in this report, *Restoring America's Position as a World Leader by Reinvesting in STEM.*

The STEM Learning Ecosystems Community of Practice invites the Biden-Harris administration to learn more about any and/or all of the subject areas outlined in this document. This can be arranged through virtual listening tours and/or in-person visits when possible.

On behalf of the millions of children and families we serve, we thank you for reading.

STEM ecosystems
Cultivate. Learn. Innovate.

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APPENDIX

ALAMO STEM ECOSYSTEM

The Alamo STEM Ecosystem is a county wide Community of Practice with a commitment to provide STEM/STEAM experiences for all students with a focus on students traditionally underrepresented in STEM/STEAM. The Alamo STEM Ecosystem acts to cultivate a STEM/STEAM mindset with a focus on equity and innovation in our community by aligning and connecting efforts. Some of the current projects that the Alamo STEM Ecosystem has undertaken include Chief Science Officers (hosted by the Intercultural Development Research Association), increasing the number of 8th grade students who select the STEM Endorsement as they transition into high school, Boeing STEM Signing Day, STEM Professional Development Day, and a STEM Asset Map for the community. The Alamo STEM Ecosystem is organized into 18+ committees to enable collaboration within our COP. In a cross-border partnership, the Alamo STEM Ecosystem is partnering with Mexico's Movimiento STEM on projects like Chief Science Officers and student exchange programs.

ARIZONA SCITECH ECOSYSTEM

A collaborative initiative of the Arizona Technology Council and the Arizona Commerce Authority, the Arizona STEM Ecosystem is a grassroots network of over 900 organizations. SciTech Institute, serving as the ecosystem's backbone organization, works with these entities to promote STEM awareness and career pathways, build leadership and employability skills, and foster a diverse pipeline of qualified Arizonans entering higher education institutions and the workforce. The network is an inaugural member of an international community of practice, STEM Funders Network STEM Learning Ecosystems, that enables practitioners to share and replicate successful STEM learning opportunities.

ARKANSAS STEM ECOSYSTEM

The Arkansas Science, Technology, Engineering and Math (STEM) Coalition is a statewide partnership of leaders from the corporate, education, government and community sectors which plans, encourages, coordinates and advocates policies, strategies, and programs supportive of excellence in science, technology, engineering, and mathematics (STEM) teaching and learning in order to expand the economy of Arkansas and produce higher paying jobs.

ATLANTA STEAM LEARNING ECOSYSTEM

TAG-Ed strengthens Georgia's future workforce by providing students with access, exposure and awareness to STEM opportunities through innovative and relevant hands-on learning experiences. By providing exposure today through internships, professional development, immersion experiences and connections to industry professionals we help shape the future workforce possibilities and talent of tomorrow.

BAY AREA STEM ECOSYSTEM

The Bay Area STEM Ecosystem is participating in the NSF funded STEM PUSH Network to leverage pre-college programs to broaden participation in STEM. In addition, we are collaborating with the East Bay STEM Ecosystem and Region 5 STEAM to support a regional approach to increasing access to and increasing the quality of STEM education in the San Francisco Bay Area. In addition, the Bay Area STEM Ecosystem is participating in a 100Kin10 Project Team to develop a regional marketing campaign to recruit and retain diverse STEM teachers.

BE'ER SHEVA

BERKS STEM CONNECTION ECOSYSTEM

Berks STEM Connection Ecosystem is focused on providing STEM thinking and learning opportunities for the 70,000+ students in Berks County, Pennsylvania. Through an alliance of business and industry, post-secondary partners, community organizations, and school districts, Berks STEM Connection Ecosystem is able to provide the latest innovations in the fields of science, technology, engineering, and math together with the Pre-K to post-secondary population to ensure a viable, thriving workforce for the future of Berks County. Initiatives include the creation of the Eastern Pennsylvania Innovation Catalyst (EPIC) Network, the result of a 2019 PAsmart Advancing Grant, through which a strong cadre of teacher leadership and extensive STEM resource lending library available to the county's schools was developed. Through a partnership with the Science Research Institute, students have opportunities to work in state of the art labs and forge connections with STEM businesses and industries around the world. Berks STEM Connection Ecosystem works in conjunction with Career Ready Berks to provide career readiness information and experiences for students and teachers in Berks County.

BILOXI STREAMING

Through Biloxi School District, Biloxi STREAMing provides high quality STREAM opportunities for all Pre K – 12th grade students after school and during the summer. STREAM stands for Science, Technology, Reading, Engineering, Economic Readiness, Entrepreneurship and Mathematics. Biloxi STREAMing advocates the increased access of all students to STEM courses and experiences, including after school and out of school programs that will accelerate and engage students to consider STEM career pathways. Biloxi Public Schools supports comprehensive STEM content professional development opportunities for PreK – 12 teachers that bolster their STEM content knowledge and expand STEM pedagogy to include but not limited to inquiry-based learning techniques. BPS identifies partners that can contribute to STEM learning opportunities, communicate the STEM education vision to stakeholders and network with and learn from other STEM organizations.

BMORE STEM

BmoreSTEM is structured around three supporting organizational groups. The heart of BmoreSTEM are its members.

BOSTEM

BoSTEM is bringing high-quality science, technology, engineering, and math (STEM) opportunities to every Boston middle schooler through an innovative citywide coalition of nonprofits, schools, researchers, and industry partners. Convened by Boston Beyond and the United Way of Massachusetts Bay and Merrimack Valley, BoSTEM aims to close the opportunity and achievement gap for youth traditionally underrepresented in STEM through exciting, hands-on learning and career mentorship.

BROWARD AREA STEM ECOSYSTEM (BASE)

Located in South Florida's diverse socio-economic and cultural community, the Broward Area STEM Ecosystem (BASE) strives to increase the focus on STEM opportunities, engagement, and benefits within the South Florida area. The Broward Area STEM Ecosystem (BASE) is a regional collaboration of STEM stakeholders in the South Florida community aligned with three primary common goals: (1) Engage and interest youth with hands-on STEM through authentic experiences and competitions; (2) Ensure foundational skills in collaboration, communication, critical thinking, compu-

tational thinking, problem-solving and perseverance; and (3) Prepare students to be life-ready for future studies and careers in any area, not only those typically thought of as STEM-related. The mission of BASE is to reach our diverse population with a diverse portfolio of STEM opportunities, assuring that STEM is for ALL students. The diverse BASE participants work collaboratively to define STEM pathways, support local STEM initiatives in and out of school, and provide a network of mentorship and volunteerism opportunities between the school district, outside of school informal STEM organizations, and local businesses with a STEM workforce. As the preK-12 education lead for BASE, opportunities for student and family engagement are shared at http://browardschools.com/stem.

CAPE COD REGIONAL STEM NETWORK

We are educators, business leaders, and community members who share a commitment to supporting young people's interest and achievement in science, technology, engineering, and mathematics learning and careers. We're inspired by ideas and examples from all over the world, but we're about building best practices in our local Massachusetts communities—on Cape Cod and the Islands and across Plymouth County.
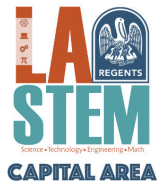
CAPITAL AREA STEM LEARNING NETWORK

Designated as a LaSTEM Regional STEM Network Center and hosted by the LSU Cain Center for STEM Literacy, the Capital Area STEM Network re-imagines how business and community partners can work together to provide quality STEM education throughout a youth's lifetime in the capital region which includes 9 parishes. Four key focus areas form the basis of the roadmap that guides activities which include investments, programmatic initiatives, partnerships, and advocacy.

CARBON/SCHUYLKILL/LUZERNE COUNTIES ECOSYSTEM

The CSL Ecosystem is the result of a grass root initiative that began in 2004 in rural Carbon/ Schuylkill County in NE PA. The heart of the ecosystem is SHINE (Schools and Homes in Education) a nationally recognized OST program, which has cultivated partnerships reaching every facet of the community. Administered by Lehigh Carbon Community College, the 42 week program includes kindergarten home visiting, 1st-4th grade STEM centers, 5th- 8th grade STEM Career Academy and high school mentoring opportunities. Cross-sector partnerships have created a pathway from pre-school to career, promoting STEM education, college/career ready students, the foundation for a strong workforce. The SHINE model was replicated in Luzerne County resulting in 19 STEM Centers over 800 sq. miles in 13 economically disadvantaged school districts and 5 CTC's. SHINE has been a catalyst for expanding STEM into the school curriculum. Community & business partners are committed to providing students STEM experiences.

CENTRAL MASSACHUSETTS STEM NETWORK ECOSYSTEM

We believe that engaging STEM (science, technology, engineering, and mathematics) experiences provide youth with a foundation for success, and we believe that all youth should have these opportunities. Since 2004, the Central MA STEM Network (CMSN) has provided thousands of youth with a variety of exciting experiences that include: classroom STEM experiences and science fair project support, out-of-school time STEM activities, and STEM festivals, as well as professional development for STEM educators. The CMSN Ecosystem is a partnership among businesses, government, non-profits, educational institutions, schools, teachers, families, and youth that enables collaborations for deep and wide-scale impacts in our communities. Our mission to nurture youth who experience low-income and under-representation with engaging STEM experiences throughout Central Massachusetts.

CENTRAL OKLAHOMA REGIONAL STEM ALLIANCE (COSTEMA)

The Oklahoma Engineering Foundation strives to increase Oklahoma's STEM education opportunities to every child. Those who have a gift for math, enjoy deconstruct-

ing and rebuilding old household items, analytical thinkers, and many other traits that make a great STEM professional are our priority, regardless of race or socioeconomic status. As an organization, we know that education is the greatest equalizer yet surveys conducted by the National Center for Science and Engineering Statistics (NCSES) within the National Science Foundation found Women, African Americans, Hispanics or Latinos, and American Indians or Alaska Natives—are significantly underrepresented in STEM education opportunities and employment.

CHICAGO SOUTHLAND STEM NETWORK

By collaborating with partners across sectors, Chicago Southland STEM Network takes an innovative approach to increase STEM equity, interest, and persistence throughout Chicago's culturally and economically diverse south suburbs. Chicago Southland STEM Network convenes educators, business leaders, and community enthusiasts to celebrate and strengthen STEM initiatives and workforce development for students.

CHICAGO STEM PATHWAYS COOPERATIVE

Chicago has a wealth of STEM learning opportunities for youth, in classrooms and through out-of-school time experiences. However, challenges to access and equity continue to persist for young people – particularly those from communities traditionally underrepresented in the sciences. How can we work collaboratively to provide allChicago youth with quality STEM experiences to support their academic, civic, and career development? The Chicago STEM Pathways Cooperative is a community-driven initiative that works to address inequities in the STEM learning continuum. Our strength-based approach focuses on three critical areas: cross-sector knowledge building, collaboration, and collective action.

COLORADO STEM

Colorado STEM is a coalition of highly engaged business, education, and civic leaders in support of high-quality science, technology, engineering, and math (STEM) education and experiences for all students.

Since its founding in 2014, Colorado STEM has successfully built a diverse coalition of stakeholders across the state to significantly expand STEM opportunities across the state. Colorado Succeeds is the backbone organization of the coalition.

DC STEM NETWORK

The DC STEM Network unites community partners to help inspire and prepare all DC youth to succeed, lead and innovate in STEM fields and beyond. The Network's partners identify common measures for high-quality STEM and map the STEM landscape to increase access, awareness, interest and engagement in STEM so that all students can graduate and enter the workforce STEM-literate

DELRAN STEM ECOSYSTEM ALLIANCE

Delran STEM Ecosystem Alliance became one of five New Jersey ecosystems, managed by the NJ STEM Pathways Network. In 2017, we were accepted into the national community of STEM Learning Ecosystems, and we are currently one of 84 internationally recognized groups focusing on networking and partnerships to create a strong STEM workforce.

DO STEM OF DAYTON, OHIO

To support this learning revolution, the Dayton Regional STEM Center (DRSC) coordinates an established network of regional institutions and professionals that provides rich opportunities for STEM education by training and supporting educators, designing curriculum aligned to the workforce needs, training school leaders at the district and building level, and supporting schools and program models committed to STEM teaching and learning.

EAST BAY STEM NETWORK

California calls on its State Universities to train public school teachers at all grade levels. STEM disciplines offer unique teaching challenges—and unparalleled opportunities—for a diverse population. STEM jobs are the fastest-growing economic sector in the Bay Area, and employers are eager to build a diverse local workforce. Cal State East Bay, serving the most diverse population in the state, established the Institute in 2011 to create a powerful regional center for STEM education—serving the hiring needs of employers as it provides education and opportunity to students throughout the region. The Institute accomplishes its mission with a Collective Impact approach, bringing together cross-disciplinary resources both on campus and throughout the community, united by the shared goal of STEM education equity for all, from cradle to career.

EAST SYRACUSE MINOA CENTRAL SCHOOL DISTRICT STEM LEARNING ECOSYSTEM

The CNY Tech Sector works to bring business partners and educational opportunities together to promote STEM career opportunities across Central New York. By highlighting learning experiences, internships, apprenticeships and jobs in the STEM and manufacturing fields, we cultivate a strong workforce and keep high quality students in CNY.

ENGINE OF CENTRAL PA, EMPOWERING NEXT GENERATION OF INNOVATORS AND ENTREPRENEURS

ENGINE of Central PA is one of the few university-led ecosystems to bring meaningful STEM research and innovations to K-12 education. Led by Penn State Center for Science and the Schools, an executive team of Intermediate Units, business/industry, and science centers/museums, and collaborations with community partners and organizations, our network builds a community of lifelong learners that promotes equitable access to meaningful transdisciplinary experiences. We strive to empower youth living and working in our region to be innovative problem-solvers, ready to succeed in careers of tomorrow.

EVANSTEM

EvanSTEM seeks to improve access and engagement for students who have traditionally underperformed or have been underrepresented in STEM programs.

FINGER LAKES STEM HUB

The Finger Lakes STEM Hub is a catalyst for collaboration among business, education, community organizations, government agencies and passionate individuals to advance the teaching and learning of science, technology, engineering and mathematics (STEM) disciplines for sustained economic vitality.

FIRST2 NETWORK

First2 Network is an expanding group of people and organizations across West Virginia that seeks to improve STEM persistence among rural, first-generation, and other underrepresented college students so that they – in turn – can contribute to an innovation economy in our State.

FLAGSTAFF STEM LEARNING ECOSYSTEM

GREAT LAKES BAY REGIONAL STEM INITIATIVE

The Great Lakes Bay Regional Alliance (GLBRA), a consortium of business, education, and community interests, recognized that the future vitality of its economy was dependent on developing a STEM Talent Pipeline. The STEM Impact Initiative was launched in the Spring of 2014 when GLBRA contracted with Accenture and Innovate+Educate to develop a comprehensive analysis of STEM in the region and develop a strategy with specific recommendations.
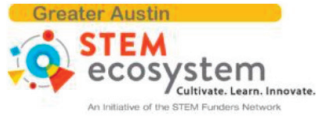
GREATER AUSTIN STEM ECOSYSTEM

The Greater Austin STEM Ecosystem fosters deeper collaboration across networks and systems to ensure STEM programming is accessible to ALL students throughout Greater Austin. The learning-centered ecosystem leverages resources supporting STEM education while reducing duplication and amplifying individual organizations and their collective impact.

Greater Bridgeport STEM Learning Ecosystem

The Greater Bridgeport STEM Ecosystem recognizes the importance of strong STEM competency across generations and the role STEM skills play in promoting a vibrant local economy. All of our partners are working to understand what it means to become a member of the STEM Learning Ecosystem Community of Practice and how will our community, businesses, and education systems benefit from it. Local nonprofits, universities, the science museum, the regional business council, STEM employers, and the Bridgeport School District all participate in this work and are engaged in strategizing to develop a shared vision, planning and prioritizing design principles including promoting STEM literacy for all, strengthening the local STEM workforce pipeline, and promoting intergenerational STEM learning opportunities.

GREATER CINCINNATI STEM COLLABORATIVE (GCSC)

Greater Cincinnati STEM Collaborative (GCSC) was launched in 2011 by P&G and StrivePartnership in response to the accelerating demand for STEM jobs in the Greater Cincinnati region. Fiscal agency moved to the UC Foundation in 2015. GCSC's mission is to prepare students to join the Greater Cincinnati/Northern KY workforce through connected, robust STEM learning pathways. Its overarching goals are to dramatically increase the number of students who are: 1) STEM aware; 2) STEM interested; and 3) engaged and on track for STEM college and careers.
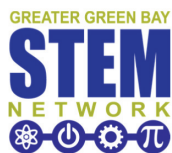
GREATER GREEN BAY STEM NETWORK

Through the Greater Green Bay STEM Network, business and educational partners collaborate to: Advocate for and increase awareness of the importance of science, technology, engineering, and math. Vet and evaluate the effectiveness of STEM opportunities. Improve community access to STEM resources.

GREATER MILWAUKEE STEM ECOSYSTEM

The Greater Milwaukee region represents a community deep in experiences and supports to advance STEM opportunities. GM-STEM unifies STEM outreach efforts across industry, K-12, higher education, and community partners throughout the seven county Greater Milwaukee region.

GREATER SOUTHERN TIER STEM LEARNING NETWORK

The priorities are fidelity of implementation and sustainability, regional assessment, development and/or deployment of STEM curricula at all grade levels, maintenance of R & D databases for data-driven decision making and the creation of systems solutions. Together, these priorities drive the realization of our primary objective: To significantly increase the numbers of STEM-capable GST graduates in general and, in particular, the numbers of students from GST schools who enter the workforce in the areas of science, engineering and advanced manufacturing.

HAWAI'ILOA ECOSYSTEM CABINET

Our proposed STEM learning ecosystem will focus on seven major themes with a representative champion who serves within a system or strategic function. System partners provide direct services to learners, organizations, and communities such as community-based, culture-focused programs or wrap-around support needs. While strategic partners center energy as architects in multi-agency, cross-partnership alignment towards coordinated efforts such as policy development, data sharing, and funding strategies. We are building worlds for possibilities and promise. Our tools are formed with resurrected wisdom and traditional values of our island culture like the sea-faring voyagers of the Hokule'a who navigate using the constellations. Our sail plan will be guided by a theory of action with the ultimate vision of a thriving culture of innovation. To journey there, we are charting seven pathways in the stars and a captain for each to lead: – Educational Institutions and school community voices – Professional development and capacity-builders – Industry partners and workforce recruitment specialists -Sustainability warriors -Equity and access advocates -Funders and investors -STEM-rich institution innovators.

HSMC TRI-COUNTY STEM ECOSYSTEM CONSORTIUM

HSMC (Hunterdon County, Somerset County, and Mercer County) Tri-county STEM Ecosystem Consortium believes in the foundational principle that communities must come together for the benefit of providing opportunities for all in STEM. The Ecosystem is bringing together multiple superintendents of schools from throughout Hunterdon, Somerset, and Mercer Counties in New Jersey.

IDAHO STEM ECOSYSTEM

The Idaho STEM Ecosystem is a network of education and workforce leaders and supporters striving for a STEM-literate Idaho. Our active community of over 100 partners includes government agencies, non-profits, PreK-12 and higher education institutions, out-of-school organizations, and representatives from business and industry. Idaho STEM Action Center (Idaho STEMAC), under the Executive Office of the Governor, serves as the backbone organization and works with statewide partners to implement programs and initiatives to advance STEM education and workforce development.

INDIANA STEM ECOSYSTEM INITIATIVE

The Indiana STEM Ecosystem is a collaborative and diverse group of over 450 statewide members who believe in the importance of building the STEM education pipeline across sectors within the state of Indiana. The Indiana STEM Ecosystem's mission is to develop, support, and "stand up" regional STEM ecosystems across the state. We believe that through the "standing up" of regional STEM Ecosystems across Indiana, we will improve STEM literacy, ensure a strong workforce & global competitiveness for all Hoosiers, and support diversity, equity & inclusion in a thriving STEM workforce.

INTERDISCIPLINARY SCIENCE AND ENGINEERING PARTNERSHIP IN WESTERN NEW YORK

A coalition of partners in Western New York State has received a five year, $9.8 million grant from the National Science Foundation (NSF) to expand the Interdisciplinary Science and Engineering Partnership (ISEP). Supported with resources totaling more than $10 million, this promising program aims to transform how science is taught in the Buffalo Public Schools. The focus of the ISEP is the critical middle school experiences of students in science and engineering, as they transition to high school. The project uses an innovative approach to teacher professional development among high-needs urban schools (including "feeder" middle schools and their corresponding high schools). This is accomplished through courses and interdisciplinary research experience, development of science and technology classroom materials aligned with state science learning standards, and inquiry-based curricula. Sample research topics include nanotechnology, molecular biology, pharmacokinetics, and response to natural and manmade emergencies— to name just a few.
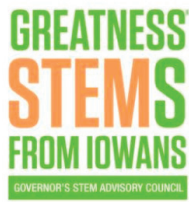
IOWA GOVERNOR'S STEM ADVISORY REGIONAL STEM HUB NETWORK

The Governor's STEM Advisory Council mission is increasing interest and achievement in STEM (science, technology, engineering and mathematics) studies and careers through partnerships engaging preK-12 students, parents, educators, employers, non-profits, policy leaders and others. The Council provides opportunities that inspire Iowa's young people to become innovative, enterprising contributors to our future workforce and the quality of life in our communities.

KC STEM ALLIANCE

KC STEM Alliance is a collaborative network of educators, business partners and organizations that inspires interest in Science, Technology, Engineering and Math careers to generate a robust workforce of related professionals for our community.

KENYA NATIONAL STEM LEARNING ECOSYSTEM

The proposed ecosystem will serve as the national STEM Learning Ecosystem and will be modelled alongside the 102 STEM schools that have been identified and equipped by the government through The Centre for Mathematics, Science and Technology Education in Africa (CEMASTEA). The Ecosystem will be used as a framework to galvanise partners from other sectors and also provide a coordinating mechanisms for STEM activities in the country. At the moment, there are different STEM initiatives by different players and there is urgent need for realignment. Young Scientist Kenya, working with CEMASTEA, a public education institution and whose mandate is to coordinate In-Service Education and Training (INSET) for practicing teachers of Mathematics and Science in Kenya will coordinate the efforts.

LANCASTER COUNTY STEM ALLIANCE

As a hub for STEM literacy and experiential learning, Lancaster County will attract and retain visionary job creators, inspire learners of all ages to achieve academic excellence, and engage all its citizenry in building a prosperous future. This vision has several key components that guide our work: Becoming a hub for STEM literacy means that we aspire to be a center for STEM innovation and leadership in Pennsylvania. As we attract and retain visionary job creators, Lancaster County will be a locale that draws visionary businesses and helps them to flourish. We will create local STEM talent by inspiring learners of all ages to embrace a culture of inquiry and achievement. By engaging all of our citizenry, we will build upon the diverse strengths of all members of our community and work toward economic and social equity for all individuals who reside in Lancaster County.

LIBERTY STEM ALLIANCE

Liberty STEM Alliance is a renowned community dedicated to enriching STEM opportunities in Hudson County by incorporating all voices, creating pathways, and serving as an information hub.

LINCOLN STEM ECOSYSTEM (LNKSE)

The Lincoln STEM Ecosystem (LNKSE) works to build a stronger Lincoln as we grow our own professionals and become more attractive to others considering our community. Lincoln has proven to be at the top of national prominence with top ranking in number of startups, funding raised, quality and availability of broadband, and workforce characteristics. Lincoln has a robust set of industry partners with STEM-based career paths focused on training the next generation workforce. LNKSE has full support of the 1,700 member Chamber of Commerce, Lincoln Partnership for Economic Development which serves as the City's economic development arm. EmployLNK, which brings together all workforce development focused agencies and nonprofits that work with youth and adults, also supports LNKSE. Schools could benefit from the development of a more integrative curriculum.

LOS ANGELES REGIONAL STEM HUB

The Los Angeles Area Chamber of Commerce has developed a regional STEM Hub for Los Angeles (L.A. STEM), which seeks to develop operational concepts for collaboration to enhance and expand the science, technology, engineering and mathematics (STEM), including critical thinking and the arts (STEAM), to explore engagement opportunities and to promote collaborative efforts to advance high quality STEM education and provide sustainable STEM models for 21st century workforce and skills development.

METROWEST STEM EDUCATION NETWORK

MSEN focuses on developing collaborations based on the sharing of resources, expertise, and common goals to support member organizations in empowering local students with the confidence and perseverance to pursue STEM-enabled career pathways, while they also recognize the value of their voice and agency in their communities. This is a critical element to address important issues in our communities, such as environmental sustainability and justice that are becoming increasingly complex and interdependent.

MICHIGAN STEM PARTNERSHIP
SOUTHEAST MICHIGAN STEM ALLIANCE

The Michigan STEM Partnership's Southeast Michigan STEM Alliance was selected to join the STEM Learning Ecosystems national initiative in 2017. We were one of 17 regional ecosystems added to the international group of 54 communities.
The Southeast Michigan STEM Alliance and the Michigan STEM Partnership were selected because of a demonstrated commitment to cross-sector collaborations in schools and beyond the classroom - in after-school and summer programs, at home, with local business and industry partners, and in science centers, libraries and other places both virtual and physical.

MIDAMERICA STEM ALLIANCE

A collaborative effort between cross-sectional partners who bring expertise, resources, and passion to achieve mutually beneficial goals and objectives which include increasing the awareness of, and engagement in, STEM related initiatives, create programs that provide opportunity to discover interests, aptitude, and talent while connecting to post-secondary career pathways. The alliance works to align and leverage existing resources to facilitate the development, execution and sustainment of relevant and effective STEM programs.

MISTEM NETWORK

It is the belief of the MiSTEM Network that all students impact economic growth through professional and personal fulfillment through equitable access to rich STEM experiences. Together the MiSTEM Network can collaborate to create a vibrant and equitable culture that meets future demands. The MiSTEM Network is building a sustainable and equitable cross-disciplinary STEM culture.

MOVIMIENTO STEM

In Movimiento STEAM we generate alliances and actions that allow the strategic linkage between key actors to position STEAM Education on the country's public and social agenda. Among other initiatives, we lead the Ecosistema STEAM, which promotes and integrates EduSTEAM institutions, organizations and providers to generate the exponential growth of STEAM Education in Mexico. We have various training, visibility, linking and support programs that facilitate communication and connections between members and ensures the continuity of actions. We are the voice of the STEAM Ecosystem before the government and stakeholders.

NC STEM ECOSYSTEM: DRIVING THE FUTURE

Driving the Future is a collaborative effort of STEM organizations across North Carolina committed to nurturing, enabling and encouraging STEM education in North Carolina with a special emphasis on the western piedmont (STEM West) and eastern regions (STEM East) of the state. Stakeholders in the ecosystem include formal education and extended learning organizations, business and industry, museums and science centers, libraries, STEM professionals and grant makers. The network leverages the expertise of its stakeholders including their knowledge of and relationships in the communities they represent in order to better serve students. The network is driven to ensure that young people have equitable access to STEM opportunities which prepare them to be successful as adults in a world that is defined by STEM.

NEPA STEM ECOSYSTEM

Our ecosystem consists of the Northeastern Educational Intermediate Unit 19, 20 public school districts, 2 comprehensive career and technology centers, 2 charter schools along with a variety of non-public entities. NEPA STEM Ecosystem serves public and private entities and the local sites of the Wayne Pike Workforce Alliance, Gentex Corporation, The Cooperage Project, Lockheed Martin, WVIA Public Media, a portion of the Charlie Company of the Pennsylvania Army National Guard and the Greater Scranton YMCA. Our goal is to provide rich STEM experiences and career opportunities to every youth within our collective footprint. Keystone College, Johnson College, Marywood University, the University of Scranton and Lackawanna College provide education beyond the PreK-12 setting. This region includes Lackawanna, Susquehanna, parts of Wyoming, Wayne and Pike counties covering a geographic footprint 2453 square miles and home to over 333,000 residents.

NEW JERSEY STEM PATHWAYS NETWORK (STATE-WIDE NETWORK IN NJ)

HSMC (Hunterdon County, Somerset County, and Mercer County) STEM Ecosystem believes in the foundational principle that communities must come together for the benefit of providing equitable opportunities for all in STEM. The ecosystem is comprised of schools from throughout Hunterdon, Somerset, and Mercer Counties in New Jersey, business industries, higher education institutions, private and public preschools, local arts organizations, environmental education centers, after school and before school providers, and municipal leaders.

NEW ORLEANS STEM NETWORK (STEM NOLA)

STEM NOLA is dedicated to bringing together quality leaders in STEM to form a "Cradle to Career" alliance working to improve educational and career outcomes as part of a shared community vision. Through a network of school-time, out-of-school programs, community-based groups, parent organizations, businesses and STEM professional organizations, STEM NOLA leads the way to identify common measures for high-quality STEM programming and map the STEM landscape to increase access, awareness, interest and engagement in STEM so that all students can graduate and enter the workforce STEM-literate.

NEWARK STEAM COALITION

The Newark STEAM Coalition (Coalition) is a cross-Ðsector collaborative established to cultivate STEAM opportunities for Newark students through the collaboration and alignment of the public (government) and private sector (businesses), the school district, institutions of higher learning, science and cultural institutions, workforce development, and youth-Ðservice providers. By capitalizing on Newark's rich resources in the arts, culture, education and research, the Coalition prepares Newark's young people for success beyond the 21st Century by building competencies across Science, Technology, Engineering, the Arts, and Math.

NJ-NEST OF BERGEN COUNTY, NJ

New Jersey North EcosySTEM, led by Bergen Community College, is dedicated to building a community of partners and collaborators to promote educational initiatives and opportunities to students pursuing STEM degrees. Through building and maintaining relationships with K-12 districts, government agencies, higher education institutions and public and private sector organizations, NJ-NEST promotes a collaborative approach to building STEM-focused pathways. Bergen Community College works closely with high schools to provide students an opportunity to earn community college credits while in high school that can then transfer to other colleges or universities.

NORTH COUNTRY STEM NETWORK

The Empire STEM Network seeks to prepare a skilled workforce to meet the growing demands of business and industry and to secure America's place as a leader in our global society. Tomorrow's workers, regardless of position or job, must be problem solvers, critical thinkers, collaborators and life-long learners. These skills must be embedded in all curricula at all grade levels from pre-school through college. Multiple opportunities must be afforded students to apply these skills to real world problems in multidisciplinary and cross-disciplinary environments that challenge them to take risks, spark creativity and reward divergent thinking.

NORTH DAKOTA STEM ECOSYSTEM

The North Dakota STEM Ecosystem is the statewide resource to improve STEM access for all North Dakotans, engaging industry, community and education systems to address workforce challenges and STEM literacy. We support initiatives that promote a lifelong learning environment to develop employability and life skills and connect passion with opportunity.

NORTH LOUISIANA STEM ALLIANCE

To coordinate efforts of diverse stakeholders in North Louisiana to provide high quality STEM education (Science, Technology, Engineering and Mathematics), including the arts, to all youth PK-16 regardless of zip code.

NORTHEAST FLORIDA REGIONAL STEM2 HUB

The Northeast Florida Regional STEM2 Hub was formed in 2015 by the Jacksonville business community with a mission to convene, inspire, and invest in the STEM2 fields by providing the essential missing elements to accelerate the growth of STEM2 education and careers. Since our inception, we have opened doors to high quality STEM programs to over 100,000 local students, both within and outside of the school day. With a focus on empowering all learners, especially those underrepresented in the high-wage, high-demand tech careers, we work every day to address inequities so that we can build pathways that will lead to a diverse, equitable and inclusive workforce. Our work spans from afterschool and summer programs to developing system-changing strategies to integrate high quality STEM programs across the curriculum and in the school day.

NORTHEAST OHIO STEM LEARNING ECOSYSTEM

The NEOSTEM (Northeast Ohio) Ecosystem is a diverse coalition for science, technology, engineering, math and computational science. The Ecosystem inspires engagement and coordination in STEM+C fields and expands equitable access to high quality education for all. The intent is to create a powerful life-long continuum of STEM+C learning opportunities that promotes a more prosperous and sustainable community.

NORTHSHORE STEM COALITION

The Northshore STEM Coalition is a member of the national STEM Learning Ecosystem network and was formed out of the rapid growth of the Tangi STEM Coalition, which was launched in 2017 by a collective of stakeholders dedicated improving STEM education opportunities in the region.

NORTHWEST ARKANSAS STEM ECOSYSTEM

The Northwest Arkansas (NWA) STEM Ecosystem is increasing STEM awareness, education, and sharing of best practices among all regional stakeholders including business, education, government, and philanthropic partners. Only through our collective and intentional efforts can we establish a well-prepared pipeline of employees ready to fill STEM-related jobs and careers dependent on the latest technologies and twenty-first-century skill sets, mind-sets, and tool sets. Forbes recently ranked Northwest Arkansas at No. 3 among the nation's medium-sized cities for white-collar job growth. Fortune 500 companies including Walmart, Tyson Foods, and J.B. Hunt Transport Services are headquartered in the region and offer numerous STEM-based career opportunities, but the local workforce is not filling job openings quickly enough. STEM education at all levels – preK through adult continuing education – is where the solution to this dilemma lies.

NY CAPITAL REGION STEM HUB

The Capital Region STEM Hub is designed to cultivate the physical and financial resources needed to engage young people in STEM education and programs—preparing them for success in school, work and life, and fueling the innovation and economic vitality of our region, state and nation.

NYC STEM EDUCATION NETWORK

The NYC STEM Education Network serves as a catalyst for new ideas, partnerships, and collaborative projects. These efforts, in turn, expand, enhance, and sustain STEM learning opportunities for all learners of all ages in New York City. We strive to ensure that all learners in New York will have the essential experience and skills needed to become career-ready, STEM-literate citizens. As our learners develop proficiency in critical thinking, problem-solving, creativity, collaboration, and communication, they will be prepared to inherit and lead the future we are shaping for them. To this end, the NYC STEM Education Network promotes inclusivity, accessibility, and accountability while encouraging creativity and innovation.

NYSCI NEIGHBORS

NYSCI serves schools, families and underserved communities in the New York City area, offering informal, hands-on learning through various products and services that use the "design-make-play" method of bringing delight and play to educating science, technology, engineering and math (STEM).

OHIO VALLEY STEM COOPERATIVE

Our STEM Learning Ecosystem builds on developing or established activities and relationships with the K-12 and higher education institutions in the Saint Clairsville area. Educational institutions include Belmont College, Belmont-Harrison Career Center, Ohio University Eastern, Saint Clairsville-Richland School District and Union Local School District. Additional stakeholders in the Belmont County Community Improvement Corporation (private non-profit economic development agency) and corporate partners from the two leading industries in the region, energy and health.

OMAHA STEM ECOSYSTEM

The committees are the action working groups that move the goals of the strategic plan forward. The committees have representatives from each of the six sectors we serve. Integrating the six sectors into each of the committees, we created a forum of collaboration around solutions for STEM issues.

ORANGE COUNTY STEM INITIATIVE

OC STEM Initiative strengthens the workforce pipeline throughout Orange County by promoting competencies in science, technology, engineering and mathematics (STEM) from cradle to career through a collaborative network of public and private partnerships.

OREGON'S STATEWIDE REGIONAL STEM HUB NETWORK

Oregon's Statewide Regional STEM Hub Network is a large-scale ecosystem that embraces the notion that education is a collective responsibility and that learning takes place throughout one's life in all manner of settings and interactions. Oregon has invested in the establishment and support of a network of regional collective impact partnerships that bring together local leaders and programs from K-12, post-secondary, out-of-school programs, business & industry, workforce, economic development, civic leaders, community-based organizations, STEM-rich institutions and families.
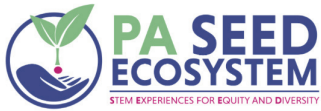
PA STEM EXPERIENCES FOR EQUITY AND DIVERSITY (SEED) ECOSYSTEM

PA STEM Experiences for Equity and Diversity (SEED) Ecosystem is a collaborative between school districts, libraries, Intermediate Units, post-secondary institutions, and environmental education centers along with growing public/private partnerships like those forged with the United Way, Chester County Economic Development Council (CCED) or Corbett Incorporated. The STEM Learning Ecosystem spans four counties and is focused on collectively leveraging resources to ensure all students in the region have robust STEM experiences P-20. There will be 590,000 new and replacement jobs in PA through 2026, with STEM jobs growing over 9 percent. Employers are clamoring for a workforce that has problem solving, communication, and computational thinking skills. PA SEED provides opportunities for students to develop these skills.

PHILADELPHIA STEM ECOSYSTEM

The Philadelphia STEM Ecosystem encompasses the rich environment of STEM programming, education, and opportunities throughout the Greater Philadelphia area. Our backbone organization, The Philadelphia Education Fund, facilitates communication and connections among Ecosystem members, and ensures the continuance of the local Ecosystem movement. Our goal is to promote just and equitable access to STEM opportunities for children and youth. Our work is made possible by the collaboration of our steering committee, workgroups and over 400 members who believe that everyone benefits when students succeed in STEM.

PITTSBURGH REGIONAL STE(A)M ECOSYSTEM

The Pittsburgh Regional STE(A)M Ecosystem cultivates diverse and equitable high quality STEM and STEAM learning opportunities, addressing real world challenges, for all students in our region with an eye toward building a scientifically-informed citizenry, and creative, prosperous, and resilient population.

PROVIDENCE AFTER SCHOOL ALLIANCE (PASA) AFTERZONE STEM - FUSE INITIATIVE

PASA's mission is to help close persistent opportunity gaps by expanding and improving quality after school, summer and other out of school time learning opportunities for all the youth of Providence by organizing a sustainable public-private partnership that contributes to student success and serves as a national model.

REGION 5 STEAM IN EXPANDED LEARNING ECOSYSTEM

The Region 5 STEAM Ecosystem is a member of the International STEM Learning Ecosystems. Locally, we are comprised of a diverse group of formal, informal science museums, non-profits, businesses and TK-16 education systems. Our ecosystem is grounded in the enlightened self interest of each collaborating entity. Collectively, we are working to achieve our vision for STEAM learning in our four county service area that includes rural, urban and suburban communities from San Jose to California's Central Coast.

SAN DIEGO STEM ECOSYSTEM

Forming cross-sector groups of STEM Champions in specific neighborhoods to set up capacity for collaborative neighborhood programs and initiatives outside of school.

SILICON VALLEY STEM ECOSYSTEM

The Silicon Valley (SV) STEM Ecosystem is committed to working as a collective impact group and has developed a common vision of STEM teacher professional development focused on how pedagogy, curriculum, and technology intersect to teach students how to use knowledge. Based on this vision, the SV STEM Ecosystem is committed to a common agenda of improving student achievement in Santa Clara and San Mateo Counties.

SOUTH CAROLINA'S STEM ECOSYSTEM COMMUNITY OF PRACTICE

Our STEM ecosystem is more than 25 years in the making with origins that date back to a National Science Foundation Statewide Systemic Initiative. Then as now, our drivers for action are access and equity. Over the years, we have expanded our understanding of access to include and engage in opportunities in the out of school time learning space. As such, our purpose is "To inspire learning and leadership every-where that STEM matters." We have grown to understand equity as a way of thinking, valuing and acting beyond simply making resources accessible.

SOUTH JERSEY STEM & INNOVATION PARTNERSHIP

The South Jersey STEM & Innovation Partnership (SJSIP) is a community of collab-orative partners to improve STEM education and career pathways across southern New Jersey. Our growing community includes collaborators representing industry, post-secondary education, K-12 schools, philanthropy, small businesses and STEM-rich organizations engaged under a common vision for STEM.

SOUTHEASTERN KENTUCKY STEM ECOSYSTEM

Southeastern Kentucky STEM Ecosystem includes 11 high needs counties that are part of a Promise Zone area. Promise Zones are extremely high poverty areas where local stakeholders collaborate and leverage resources to help address regional priorities such as improving educational outcomes, leveraging public and private resources, or increasing economic opportunity. Partners for Education at Berea College convenes the Southeastern Kentucky ecosystem using a results based and collective impact framework. The partnership integrates the work of school districts, higher education and businesses to bring awareness to STEM career pathways and to ensure that youth in the focus counties have access to high-quality supports and STEM programming. The Southeastern Kentucky STEM Ecosystem brings together a diverse group of cross-sector partners with a goal to inspire all learners to become visionary STEM cre-ators and innovators through cross sector collaboration and partnership that identify, develop, and support real world application of inquiry based knowledge.

ST. LOUIS REGIONAL STEM LEARNING ECOSYSTEM

STEMSTL is a collaborative consortium committed to equitable access to high-quality STEM learning and employment opportunities for all learners in the St. Louis metro region. Our mission is to collectively develop and deploy quality systems-level changes that will advance STEM learning and career opportunities to empower the growth of diverse problem solvers, innovators, and critical thinkers, enabling them to thrive in a globally connected world.

STEM GUIDES DOWNEAST

Tucked away on the easternmost corner of the U.S, Washington County, Maine is home to just under 32,000 residents spread across an area greater than Delaware and Rhode Island combined. Working together to increase student access and engagement in afterschool STEM, three not-for-profit organizations spearheaded the development of the STEM Learning ecosystem here – Axiom Education & Training Center, UMaine Cooperative Extension: 4-H in Washington County, and the Maine Mathematics and Science Alliance. With funding from the National Science Foundation, they've reached out to local STEM education leaders to assess the opportunities and obstacles to growing a STEM learning environment for local youth. Along the way, they have engaged local individuals and institutions to launch a number of exciting out-of-school programs like 4-H STEM Ambassadors, Family Code Night, and Teen Science Cafes, which not only expand opportunities for youth, but also leverage a strong culture of collaboration among community leaders.

STEM SENC (SOUTHEASTERN NORTH CAROLINA)

STEM SENC is a regional effort in surrounding counties to bring together individuals, organizations, schools, institutions, and businesses for the purpose of supporting STEM learning in southeastern North Carolina. We provide access to aspirational STEM learning opportunities for all learners and those who support them regardless of geographic location, socioeconomic status, race, gender/sex, culture, or ability.

STEM WORKS EAST CENTRAL OHIO

The Central Ohio hub facilitates partnerships that amplify and accelerate existing STEM programs within the region. All programming developed and shared in the hub is open to any school, district, private sector and non-profit partnership in the region.

STEM-NM

STEM-NM is a dynamic network of cross-sector partners committed to making real impact on STEM education and degree attainment in the Albuquerque metropolitan area. Our vision is that all residents of central New Mexico will have access to a highly coordinated and comprehensive system of support to increase their awareness and understanding of science, technology, engineering, math, and health (STEM-H); all students in central New Mexico will engage in high-quality systematic STEM-H educational and career-oriented experiences, both in school and out of school; and all students with an interest in STEM-H fields will persist through a STEM-H course of study.

SYMBIOSIS

We reached out to our staff, volunteers, board, and numerous community stakeholders. We facilitated listening sessions with groups and conducted one-on-one interviews. To date, over 1,400 individuals from across British Columbia have answered the call and generously offered their input. Through this intensive consultation process, a strong consensus has emerged around several themes. Among them, equity, ecological sustainability, community collaboration, and a focus on the future. Many have argued that Science World should address pressing issues at the intersection of science and society—in particular the growing need to scale education in the areas of Science, Technology, Engineering, Art & Design, and Math (STEAM).

TAMPA BAY STEM NETWORK

STEM Learning Ecosystems provide the architecture for cross-sector learning, offering all young people access to STEM-rich learning environments so they can develop important skills and engagement in science, technology, engineering, and math throughout Pre K-16.

TEXAS ECOSYSTEM

The Texas Education Agency is excited to announce that we were accepted into the community of practice of the national STEM Learning Ecosystems Initiative. Learning Ecosystems provide the architecture for cross-sector learning, offering all young people access to STEM-rich learning environments so they can develop important skills and engagement in science, technology, engineering and math throughout Pre-K-20. Strong STEM Learning Ecosystems feature dynamic collaborations among schools, out-of-school time programs, STEM expert institutions (such as museums, science centers, institutions of higher education and STEM professional associations), the private sector, community-based organizations, youth and families.

TULSA REGIONAL STEM ALLIANCE

TRSA is an intermediary organization that is flexible and inclusive enough to welcome all community members yet includes sufficient structure and organizational support to facilitate and coordinate the work that needs to be done.

UTAH STEM ECOSYSTEM

Our ecosystem includes the Salt Lake Education Foundation, local school districts, education foundations, business and industry partners, informal science education, institutions of higher learning, and local community members. We engage with local and rural districts throughout the state.

VENTURA COUNTY STEM NETWORK

VC STEM is a collaborative and interdisciplinary community working to foster the development of tomorrow's STEM leaders. Together we – leaders from higher education, PreK-12 education, business and industry, national parks, local and state government, the military, and non-profits – are laying down a local infrastructure extending from pre-kindergarten to post graduate studies that will encourage our students to be curious and engaged, and ensure that they are prepared, able and ready to join the STEM workforce and become the STEM leaders of tomorrow.

WASHINGTON STEM NETWORK

Washington STEM is a statewide, education nonprofit leveraging STEM for social change, removing barriers to credential attainment, and creating pathways to long-term economic security for systemically underserved students.

WNY STEM

WNY STEM Hub Inc., a 501(c)(3) nonprofit organization, mobilizes schools and stakeholders to develop, nurture and maximize interest in STEM careers through hands-on, one-of-a kind experiences. WNY STEM is an initiative of the United Way of Buffalo and Erie County, the UB Center for Integrated Global Biomedical Sciences and the Empire State STEM Learning Network. Its purpose is to the WNY Community to empower students through life changing STEM experiences – such as the award-winning Hand in Hand, Girls Coding, Schools on the Move and Take Flight Space Experiments Programs – to tackle careers in science, technology, engineering and math.