TIES TEACHING INSTITUTE FOR EXCELLENCE IN STEM

Delran STEM Ecosystem Alliance

Delran Township Schools
Board of Education
50 Hartford Road, Delran, NJ 08075

January 3rd, 2017

NEW JERSEY STEM LEARNING ECOSYSTEMS

www.njstemecosystems.org

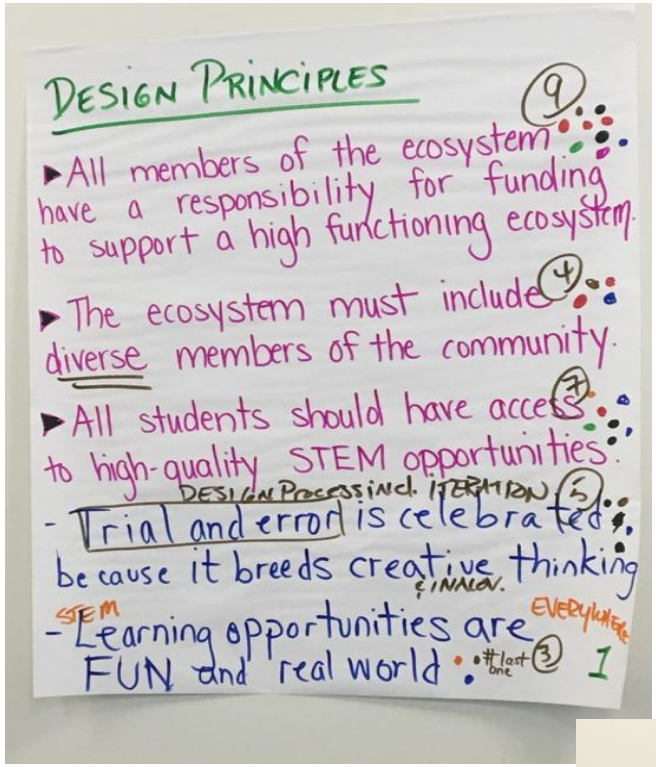
NEW JERSEY STEM LEARNING ECOSYSTEMS
Delran STEM Ecosystem Alliance

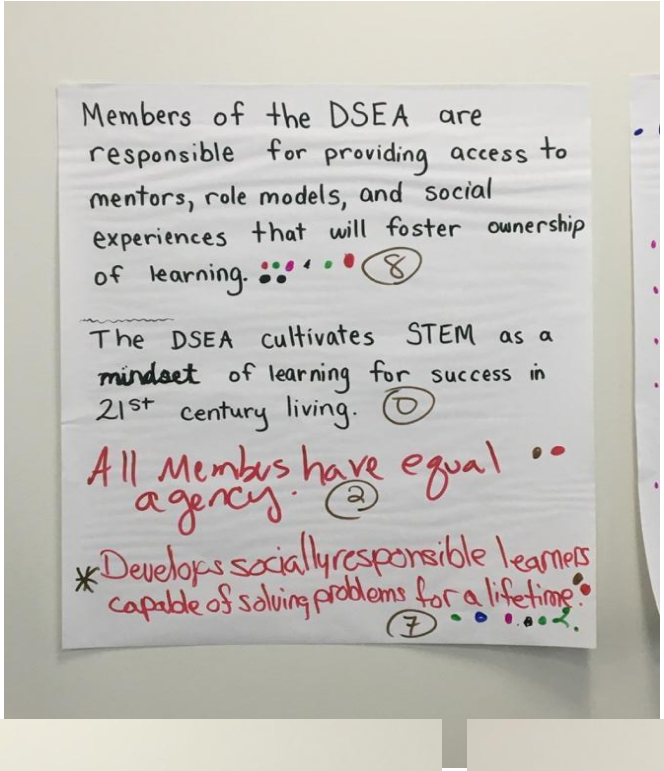
Design Studio Meeting 1

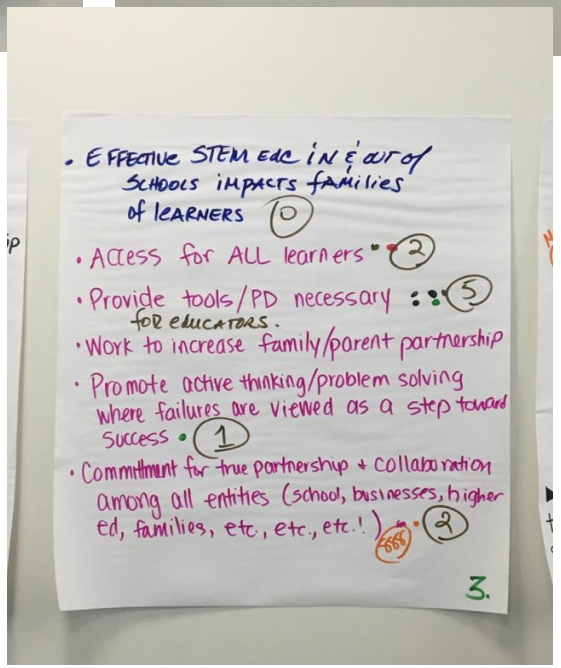
The Design Studio (known as the Design Team) worked together to:

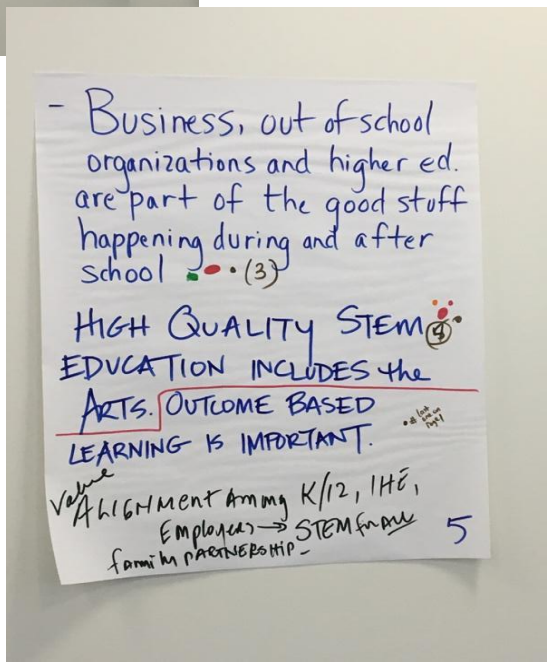
Craft a shared articulated vision for the work in the form of:

- Aspiration Statement
- Design Principles (The Non-Negotiables)
- Design Features









NEW JERSEY STEM
LEARNING ECOSYSTEMS

NEW JERSEY STEM
LEARNING ECOSYSTEMS
Delran STEM Ecosystem Alliance

THE 21ST CENTURY VISION FOR STEM….FOR ALL CHILDREN

NEW JERSEY STEM LEARNING ECOSYSTEMS

STEM IS INCLUSIVE OF THE ARTS

STEM IS INCLUSIVE OF DESIGN THINKING AND DESIGN LITERACY

STEM IS INCLUSIVE OF COMPUTATIONAL THINKING AND LITERACY

STEM IS ALIGNED WITH WORKFORCE

STEM IS ALIGNED WITH ECONOMIC DEVELOPMENT

NEW JERSEY STEM LEARNING ECOSYSTEMS
Delran STEM Ecosystem Alliance

STEM Funders Network

NEW JERSEY STEM LEARNING ECOSYSTEMS

STEM Funders Network Membership History

www.njstemecosystems.org

Global Societal Challenge

- Level 1
- Climate Change
- Water Scarcity
- Energy Security
- Cyber Security
- [illegible]
- [illegible]
losses
- Fisheries Depletion
- Deforestation
- Infectious Disease

Unfortunately, little to no connection between education and real world

- Level 2
  - Poverty
  - Education
  - The Digital Divide
  - Urbanization
  - [illegible]rty
  - [illegible]nd migration
  - E-Commerce rules
  - Biotechnology rules
  - Maritime Safety and Pollution

Eliminate our way of life

Disruptive to our way of life

Credit: Gregory Washington, PhD, Dean, Samueli School of Engineering, University of California, Irvine

Unprecedented Global Competitors

Are we educating students to truly compete globally?

Credit: Gregory Washington, PhD, Dean, Samueli School of Engineering, University of California, Irvine

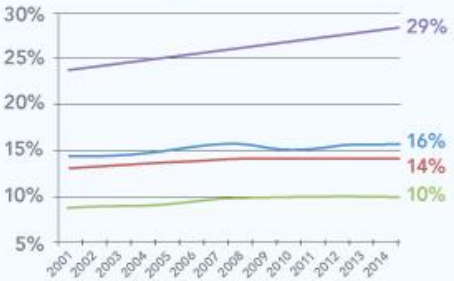
Equity Challenge…

Women have seen no improvement in STEM since 2001

Women remain as scarce as ever in engineering, computing, and advanced manufacturing.

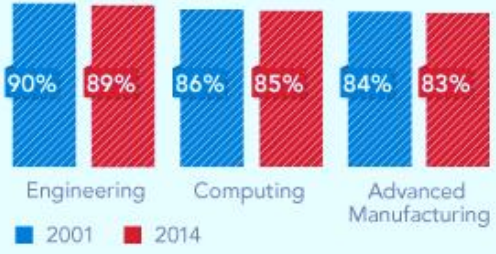
Women as a percentage of the:	2001	2014
Engineering Workforce	13%	12%
Computing Workforce	27%	26%
Advanced Manufacturing Workforce	10%	10%

African Americans and Latinos have lost ground in STEM

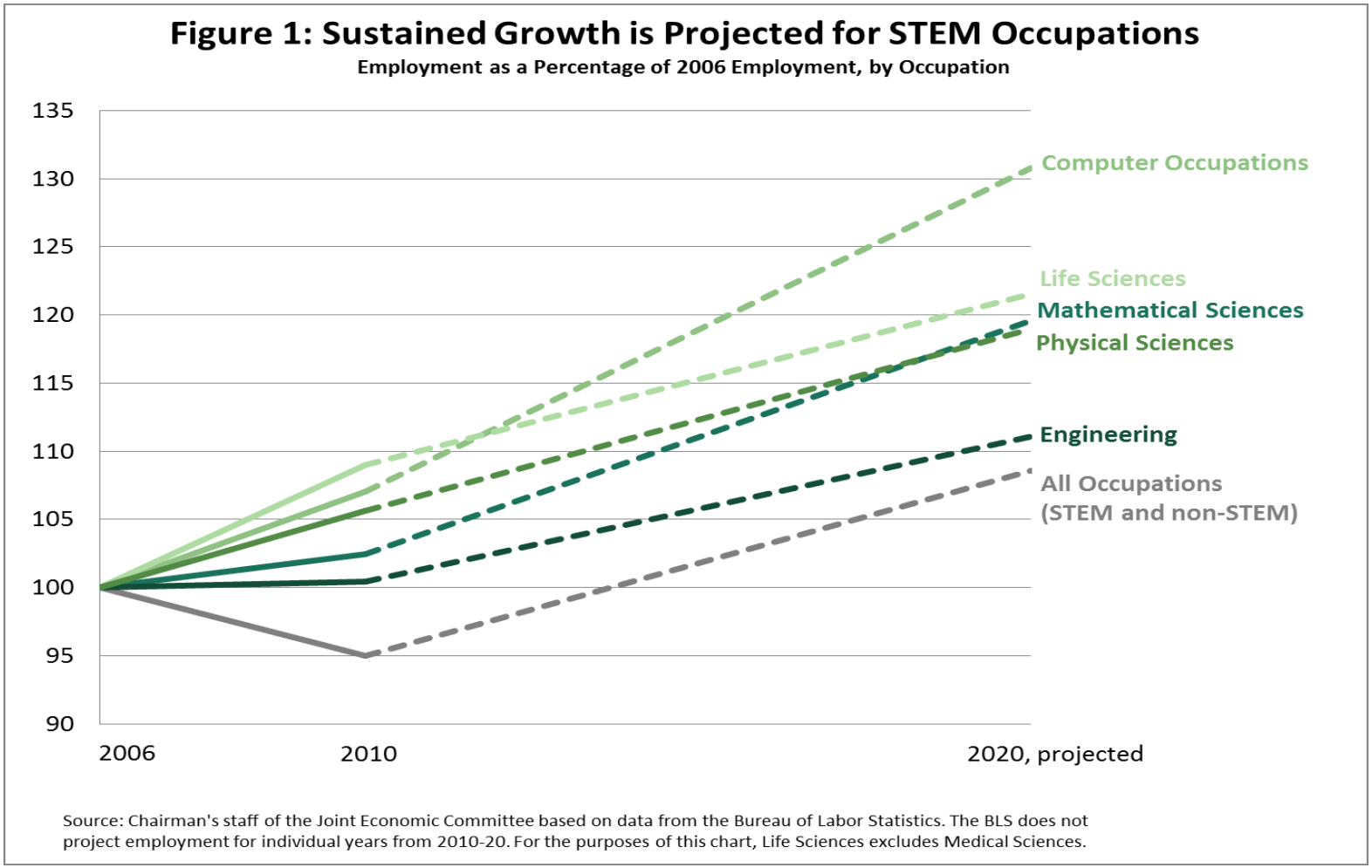


Whites and Asians still dominate the STEM workforce

Between 2001 and 2014, whites and Asians declined from 74 to 69 percent of the working-age population. Yet their dominance in critical STEM occupations continues unabated.

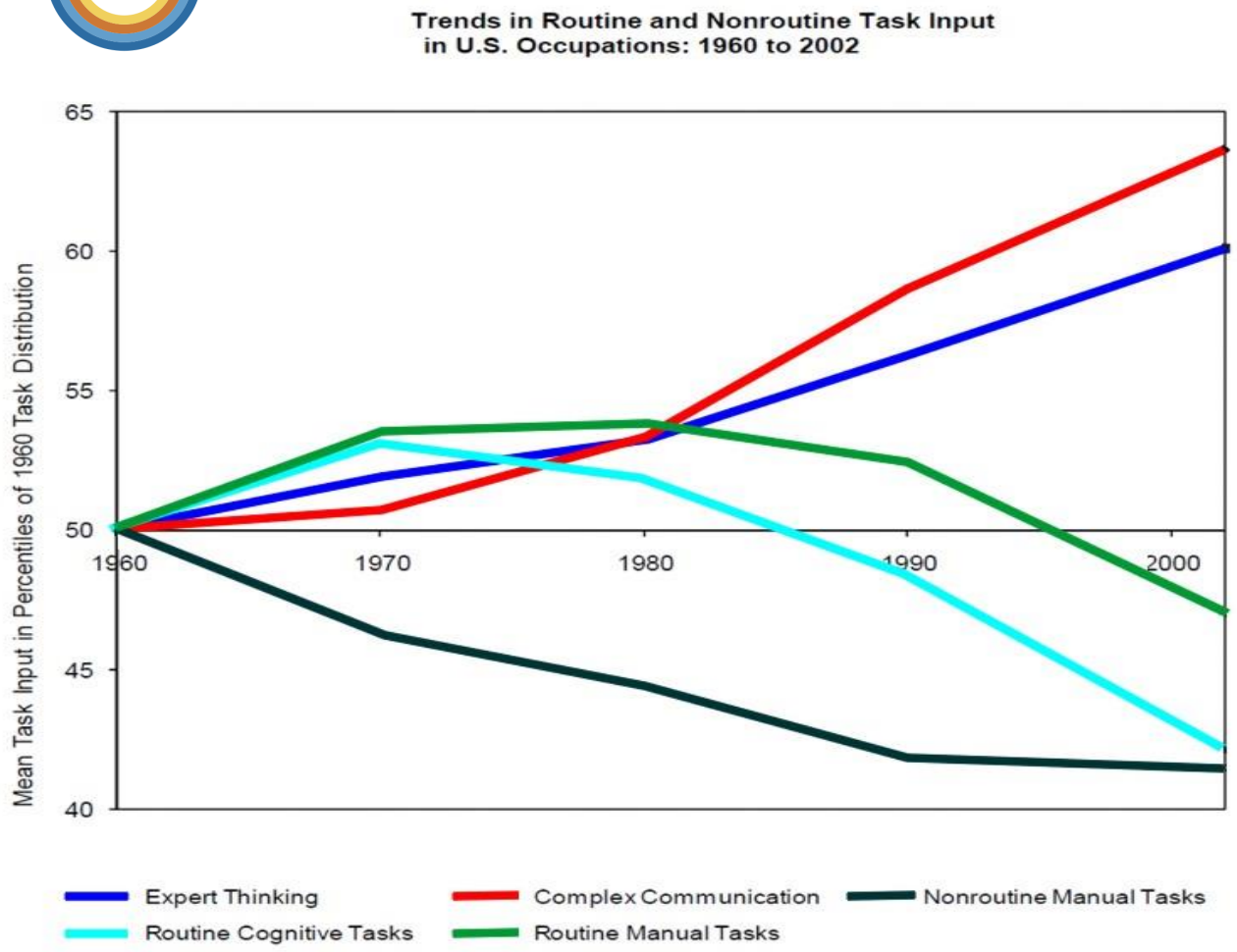


Employment Challenge…



Attribution: Ellen Lettvin, US Department of Education

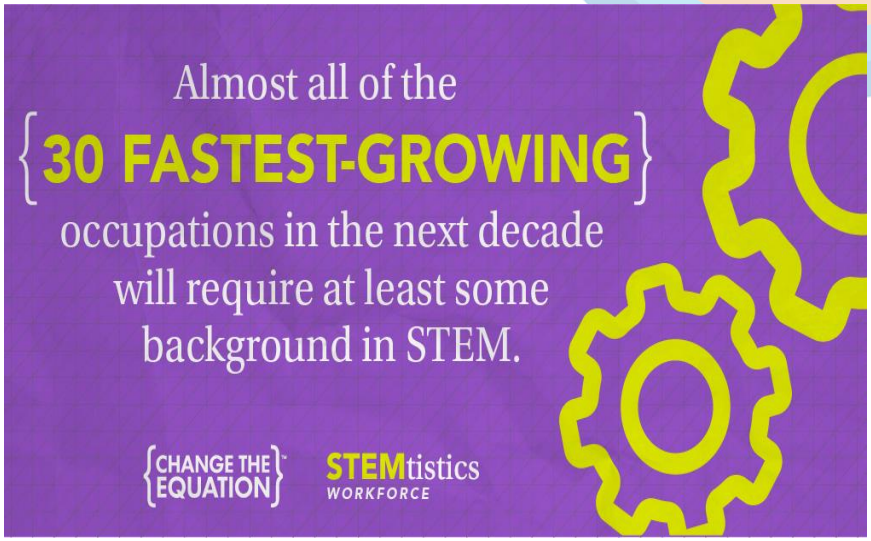
Skills Gap Challenge…

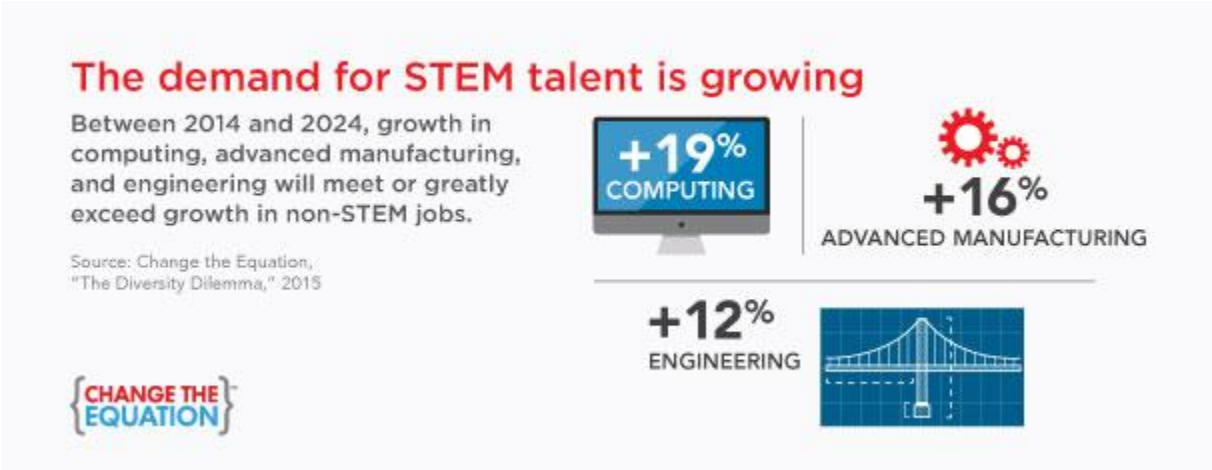


Source: Autor, Levy and Murnane (2003) updated to 2002 by David Autor.

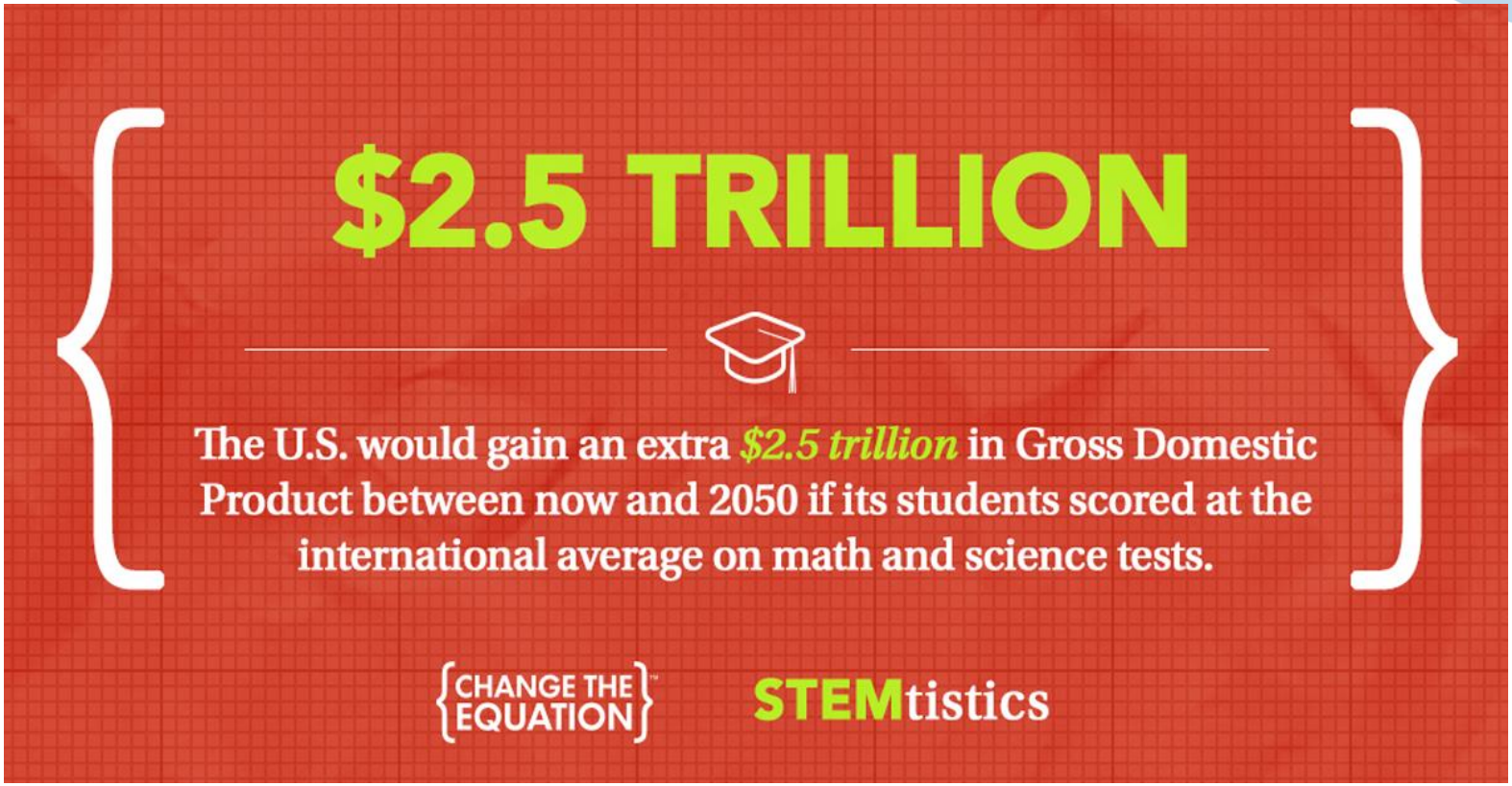
Credit: Ellen Lettvin, US Department of Education

Opportunity…

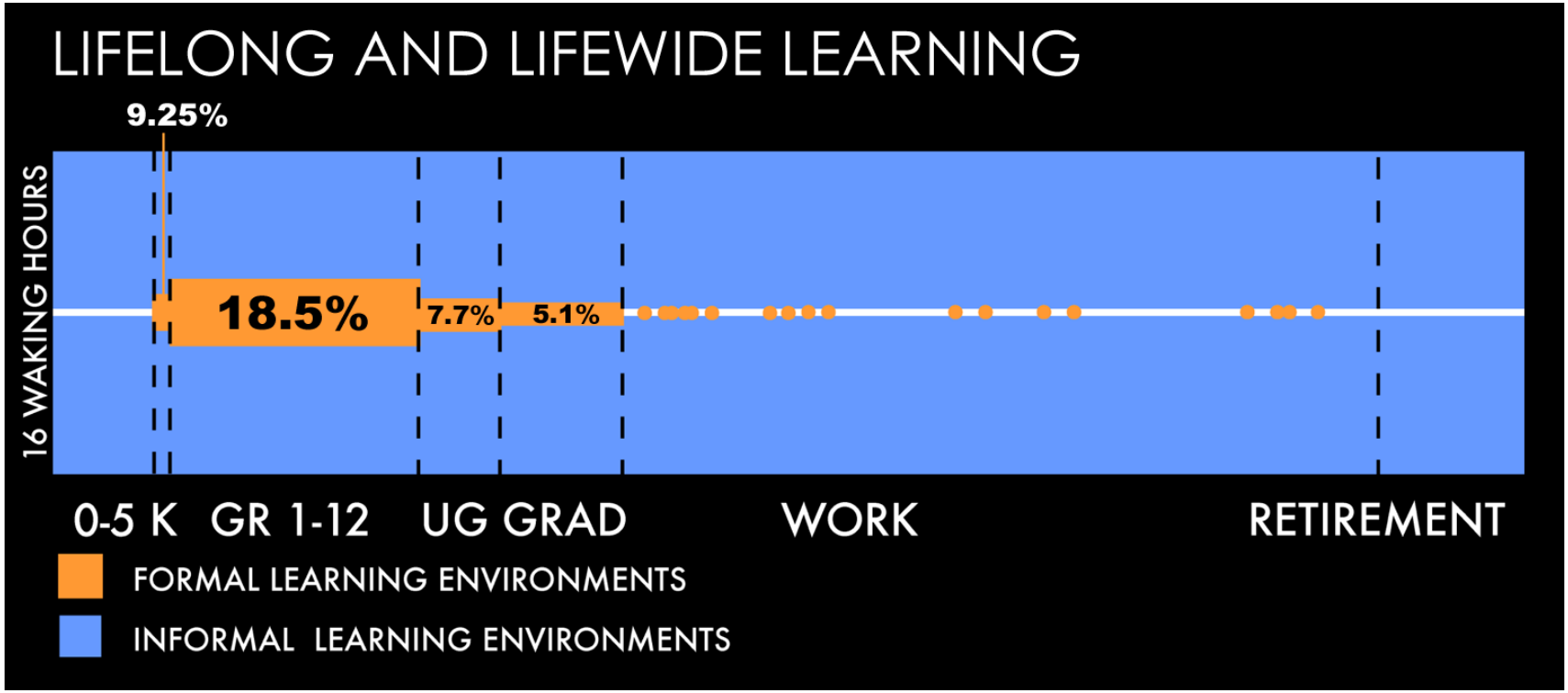




Impact…


$2.5 TRILLION
The U.S. would gain an extra $2.5 trillion in Gross Domestic Product between now and 2050 if its students scored at the international average on math and science tests.
CHANGE THE EQUATION
STEMtistics

Underlying Premise…
When Does Learning Occur?



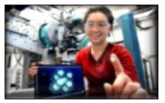
STEM Learning Ecosystems


STEM-Rich Institutions



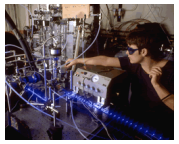
Business Community



Institutes of Higher Education







Learner Centric





Formal PK-12 Education


Family



Out-of-School Programs



Source: Ellen Lettvin, US Department of Education

The Focus: STEM Ecosystem Elements

Key Partners

1. PreK-12 school system receptive to external partnerships
2. High-quality out-of-school time/youth development system and programs
3. STEM-expert museums, science centers, professional associations, and businesses
4. Institutions of higher education
5. Private sector STEM-focused businesses
6. Parent and community-based organizations

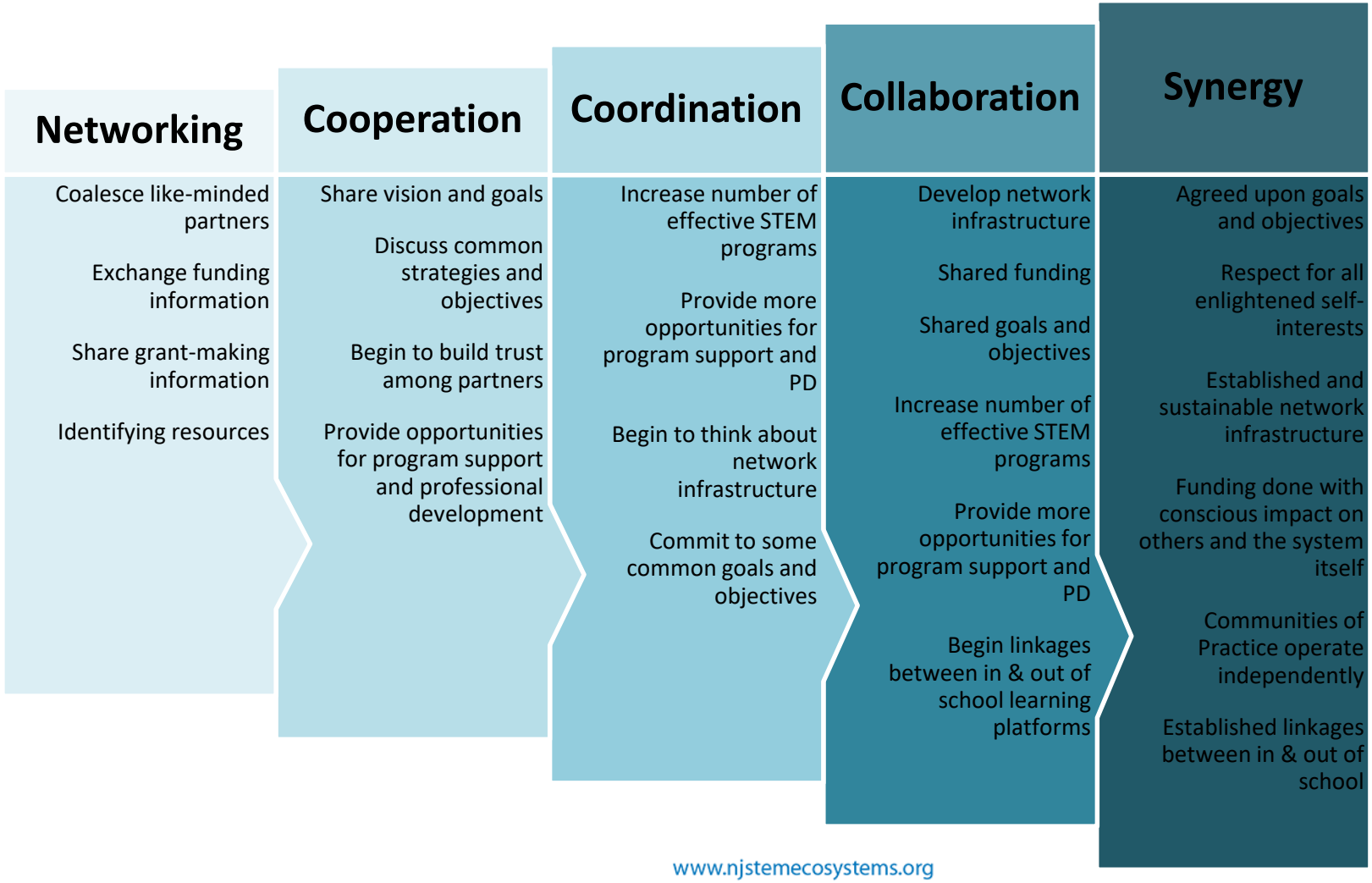
Critical Attributes

1. **Anchored by a passionate leader(s) with a collaborative vision and practice**
2. Attentive to the enlightened self-interest of all partners
3. Philanthropic and public sector support and in-kind resources

Focus Areas

1. Building the capacity of educators in all sectors.
2. Equipping educators with tools and structures to enable sustained collaboration.
3. Linking in- and out-of-school STEM learning.
4. Creating learning progressions that connect and deepen STEM experiences over time.
5. Focusing instruction on inquiry, project-based learning and real-world connections to increase relevance.
6. Engaging families and communities.
7. Exposing young people to potential STEM careers.

The Evolution of a STEM Learning Ecosystem



Conceptual Ecosystem Logic Model

Resources	Activities	Outputs	Short-Term and Intermediate Outcomes	Impact
• **Local Initiative** *(Members, community partners, network connections and infrastructure)* • **Implementation Partners** • **Steering Committee** *(Members, network, expertise)* • **Formal Ed** • **Science Centers** • **Youth Development Entities** • **Afterschool and Summer STEM Programs** • **Leveraging Existing networks** • **State STEM Network** • **State Afterschool Network** • **Higher Ed** • **Business** • **Community**	• **Develop Technical Support (PL/PD)** *(infrastructure, capacity, key partners, communication, project management)* • **Develop and implement program support and professional development** *(program support and professional development delivery model based on three levels of technical assistance)* • **Develop and implement Communities of Practice** • **Develop STEM resource menu** • **Assist in defining effective STEM programs for program implementation/improvement and evaluation purposes**	• **Number of partners in network** • **Number of STEM learning opportunities across counties** • **Number of educators engaged in professional development** • **Number of members in each Communities of Practice** • **Types of STEM resources introduced to counties** • **Number of effective STEM programs** • **Evaluation findings**	• **Program outcomes**: An increase in the intensity, duration and quality of STEM learning opportunities. • **Staff outcomes**: An increase in the confidence, competence, and motivation in offering STEM learning opportunities. • **Student outcomes**: An increase in engagement, interest, and applied knowledge of STEM content and processes. • **Initiative outcomes**: The documentation of promising practices, linking of results to specific STEM in OST models, and the sharing of this information with the field in ways that can effectively guide program improvement and expansion efforts.	• **All students possess the requisite STEM skills to be competitive for 21st century jobs** • **All educators and teachers are provided the tools and support to ensure their students are STEM competent and STEM literate** • **Community is a leader in STEM workforce competitiveness in State and the United States**

Cohorts 1 & 2 Communities

STEM Learning Ecosystems

National SLE Community of Practice, COP

www.stemlearningecosystems.org

Delran STEM Ecosystem Alliance

Vision for the Future

1. Pointing girls and historically underrepresented students toward Role Models in STEM that they associate themselves with;

2. Seeking out and successfully engaging young people to participate in high-quality, diverse and interconnected STEM learning experiences;

3. Actively engage young people in STEM, as detailed in the Next Generation Science Standards and other similar state standards for science education;

4. Providing teachers with the tools they need;

5. Showing students that STEM is about trial and error;

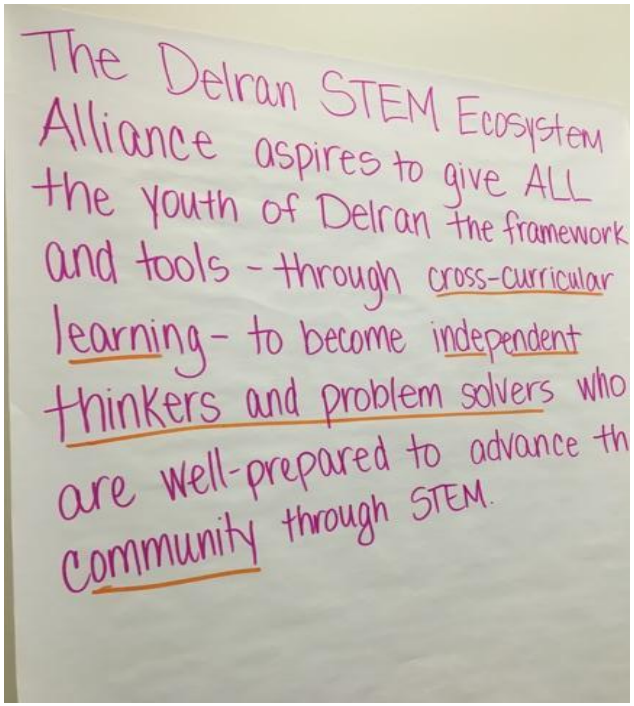
6. Underscoring that STEM careers lead to socially good and meaningful careers; and

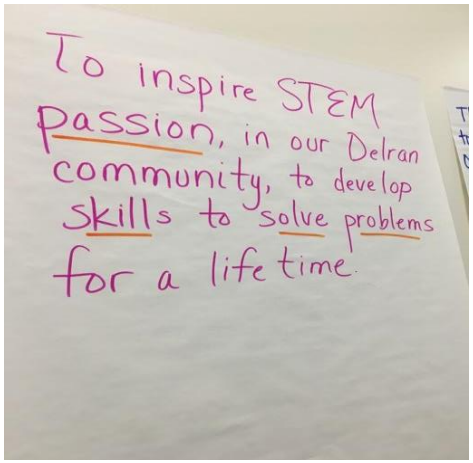
7. Prioritizing mentoring moments from Day 1

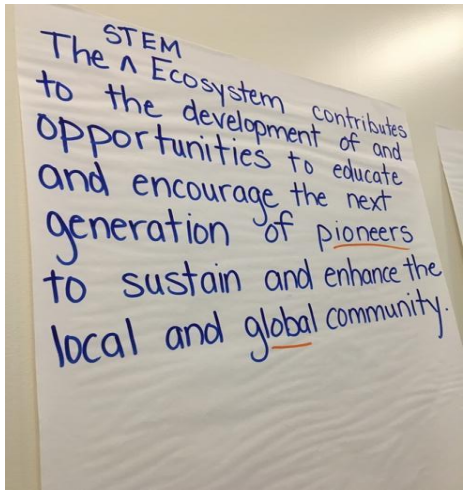
Delran STEM Ecosystem Alliance Design Principles

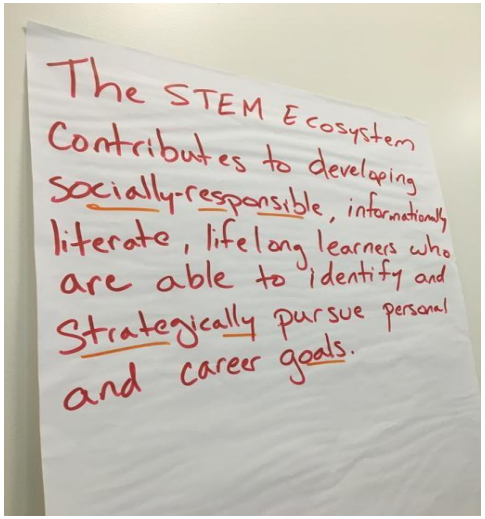
"The Non-Negotiables"

Delran STEM Ecosystem Alliance Survey









Delran STEM Ecosystem Alliance Survey

Developed to capture general attitudes, awareness and assets of STEM in Delran

Questions designed to generate conversation and discourse, not as a statistically valid analysis of the state of STEM in the region

Survey designed to capture updated landscape information around STEM programming, services and supports

Delran STEM Survey…

High Level Findings

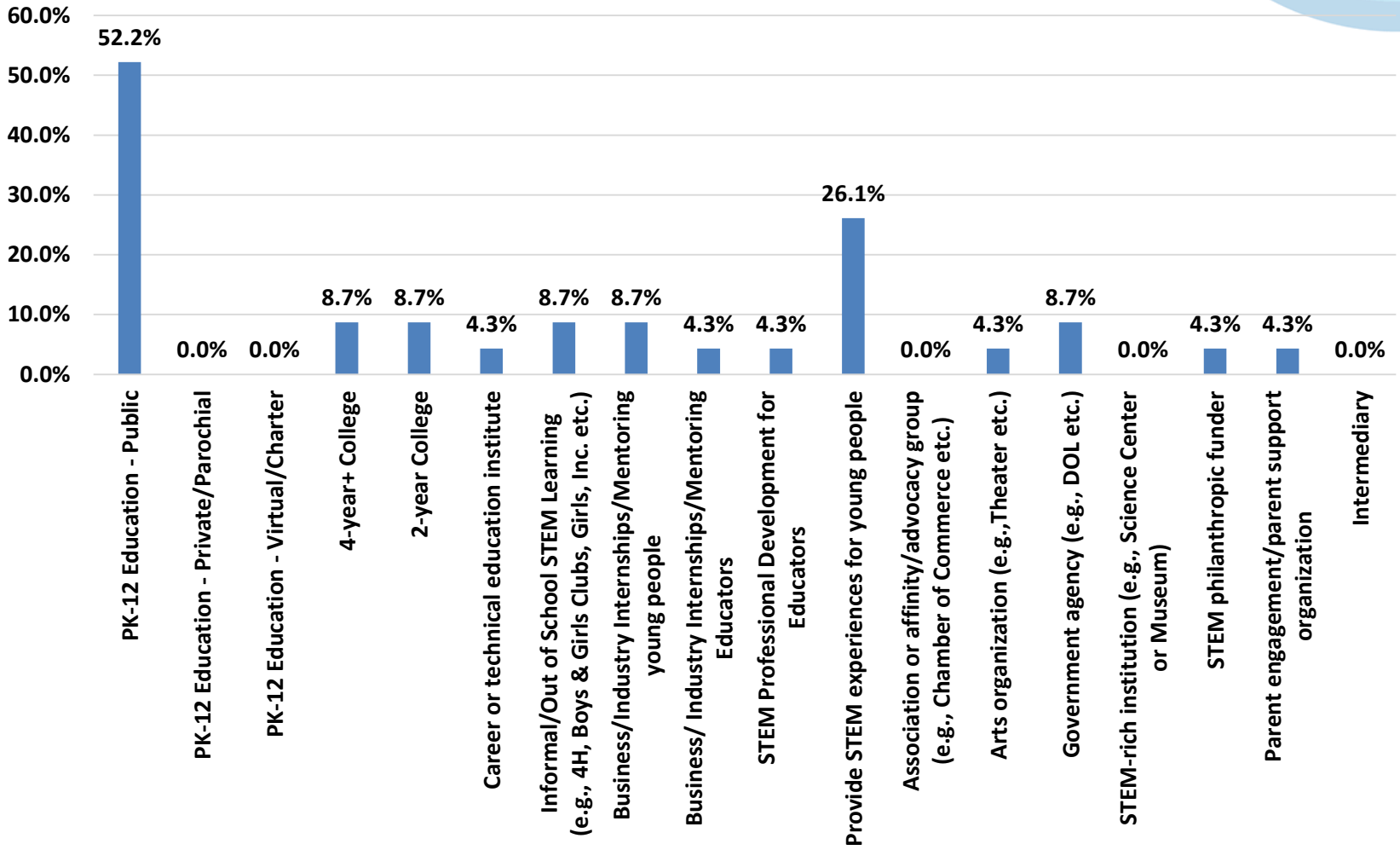
Total of 23 responses were collected

Educator Heavy - **52.2%** of the responses were from the formal PK-12 sector

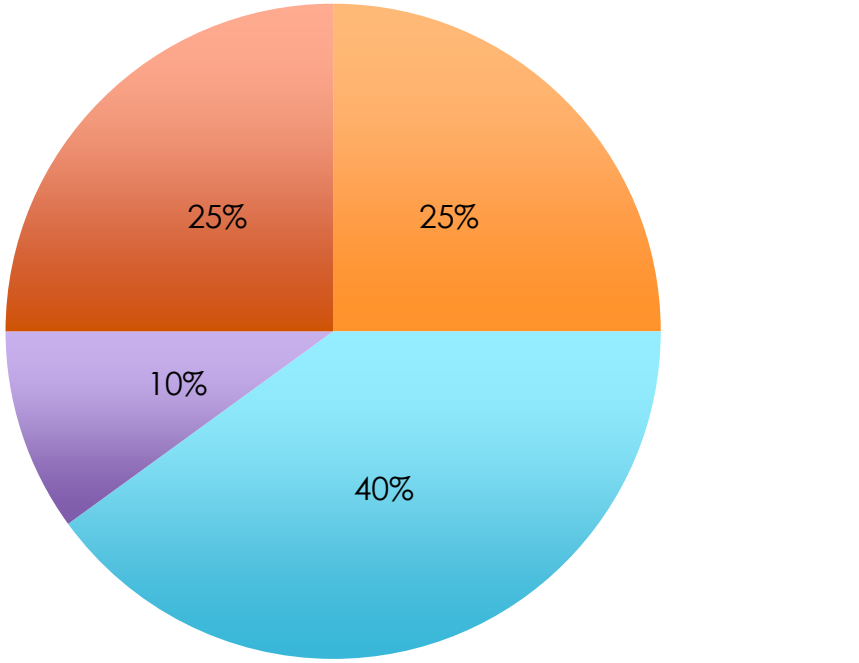
Experience and Commitment - **25%** have been STEM advocates for 10+ years

Types of STEM Advocacy – 42.9% believe that they research and continuously improve STEM programs and and an additional **42.9%** facilitate and support community engagement around STEM learning for all young people well

What best describes your organization's role as a STEM supporter? (Please select all that apply.)

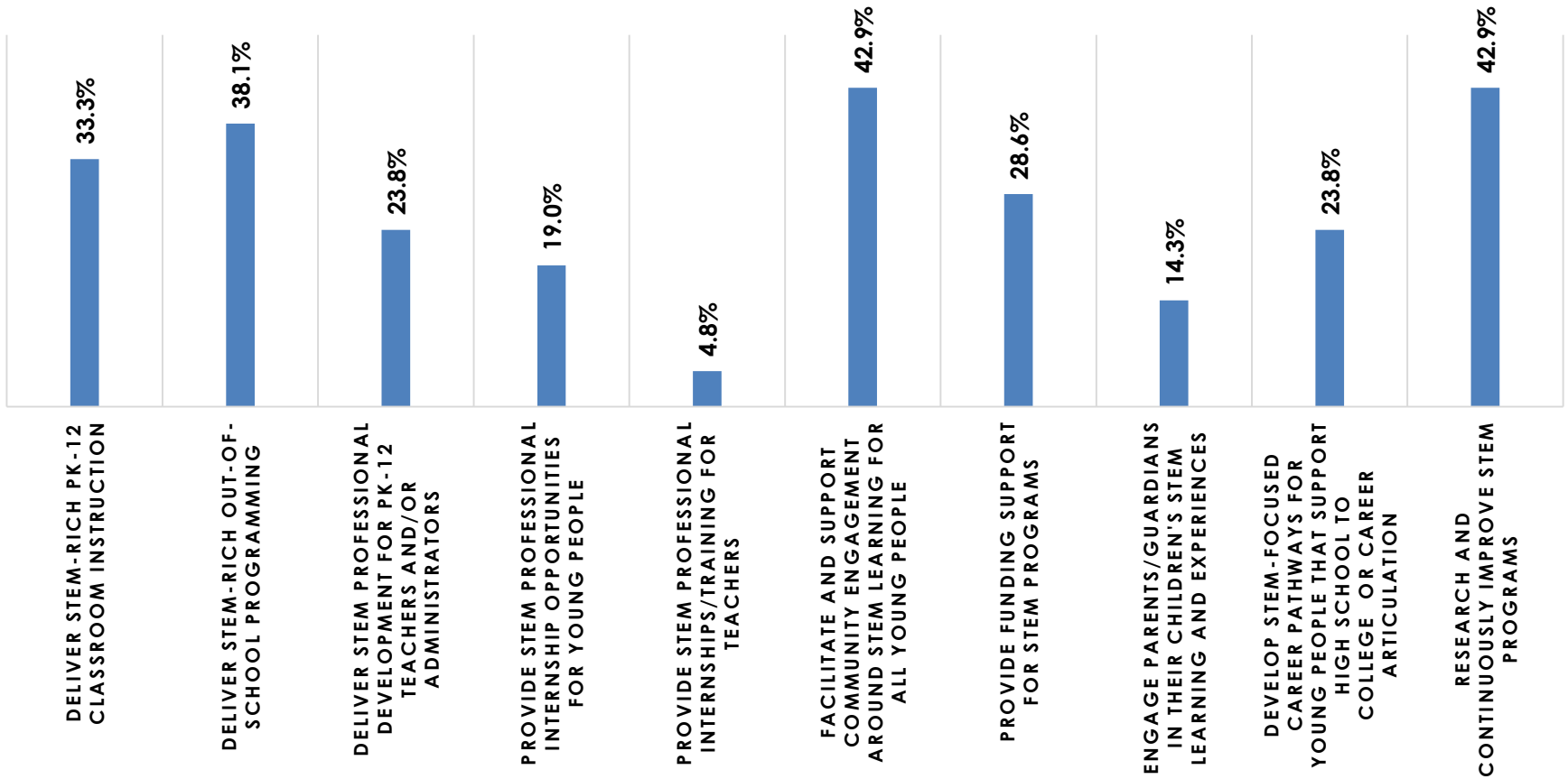


How many years has your organization been a STEM advocate?



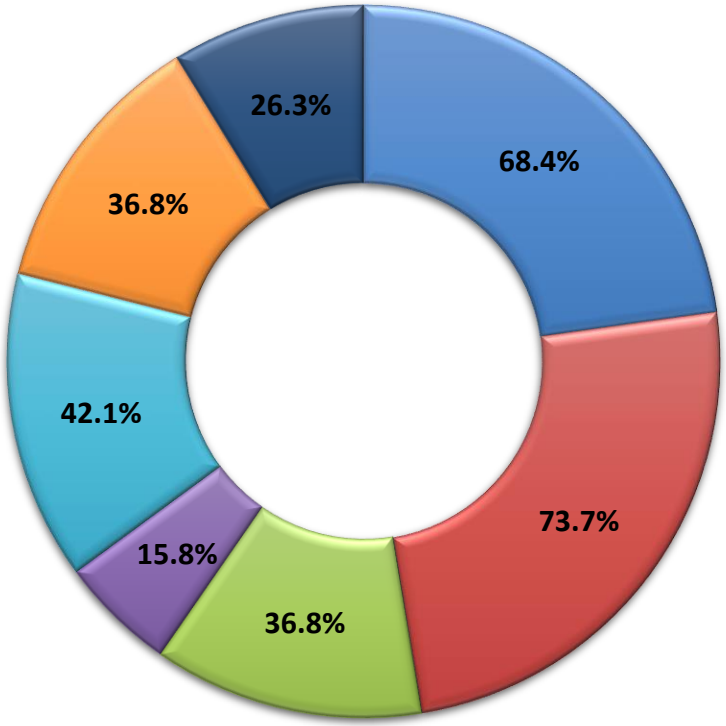
NEW JERSEY STEM LEARNING ECOSYSTEMS
Delran STEM Ecosystem Alliance

AS A STEM ADVOCATE, WHAT DOES YOUR ORGANIZATION DO REALLY WELL? (PLEASE SELECT ALL THAT APPLY.)



Help us understand your attitudes and awareness of STEM learning and teaching in the community. (Please select all that apply.)

- School districts visibly support a commitment to STEM education.
- Our community is developing a positive, college or career bound culture focused on STEM.
- Our community is developing a STEM focused work-ready culture.
- Our community of out of school organizations is committed to STEM learning (e.g., 4H, Boys & Girls Clubs, Girls, Inc. etc.)
- Our community is focused on aligning in and out of school learning.
- Our community is committed to long-term funding to sustain our STEM Learning Ecosystem.
- Our community engages families in shared vision/decision-making.

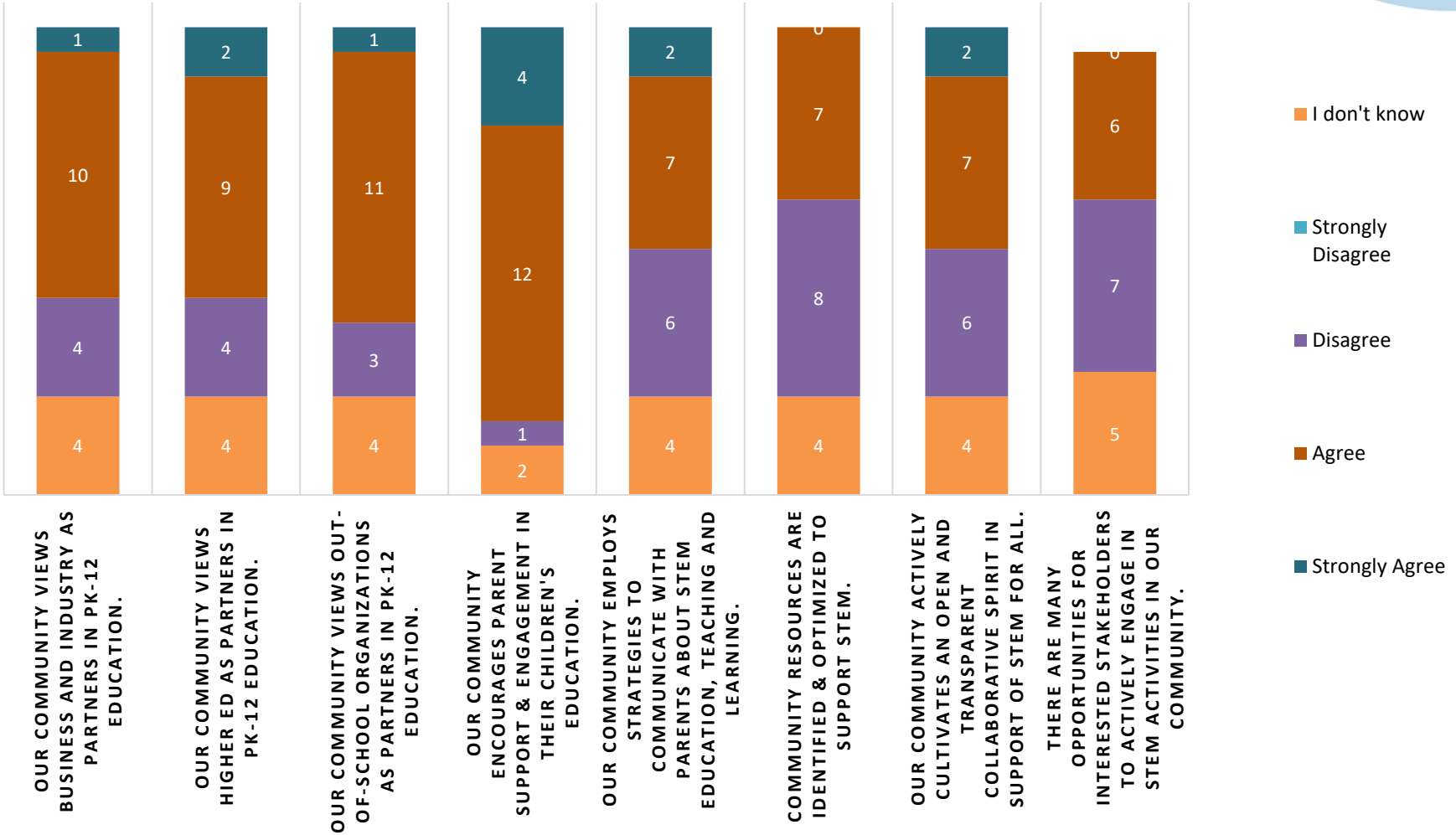


Delran STEM Survey…
High Level Findings

Development of 21st Century Skills - 52% of respondents believe youth are developing competencies in 21st century skills in school (**48%** believe this is happening in out of school time)

Student mentoring is valued - **50%** of respondents said that business and industry do a good job mentoring students, and **88%** said they welcome even more from business and industry, including more mentoring and provision of family STEM experiences. Additionally almost **87%** of respondents welcome more mentoring and academic coaching from higher education partners

IN YOUR OPINION, HOW DOES THE COMMUNITY APPROACH/VIEW AND ENGAGE IN PARTNERSHIPS AND CROSS-SECTOR COLLABORATIONS TO SUPPORT STEM TEACHING AND LEARNING?



Delran STEM Survey…
High Level Findings

Development of 21st Century Skills - 52% of respondents believe youth are developing competencies in 21st century skills in school (**48%** believe this is happening in out of school time)

Student mentoring is valued - **50%** of respondents said that business and industry do a good job mentoring students, and **88%** said they welcome even more from business and industry, including more mentoring and provision of family STEM experiences

STEM Pathways Network… Vision and Mission

The Delran STEM Ecosystem Alliance provides an integrative, interactive system with a shared vision for developing and growing a sustainable and collaborative STEM community that is characterized by proactive and passionate thinking while providing all Delran learners equitable access to high-quality STEM learning and work opportunities.

Delran Asset Survey Link – Please use the link to complete the survey:
https://www.surveymonkey.com/r/DelranSTEMEcosystemAlliance

Delran STEM Ecosystem Alliance Vision

SPN Vision

New Jersey attracts, cultivates and retains a 21st century workforce that is engaged and supported through statewide alignment of public and private STEM educational resources, ensuring the state remains globally competitive in STEM industries and continues its rich history of innovation.

SPN Mission

The **NJ SPN**, a public-private strategic alliance, defines and guides a statewide STEM vision for pre-K-to-workforce formal and informal learning opportunities that strengthen academic skills and inspire students; facilitates research and recommendations on STEM talent pipeline needs and barriers to success; and exposes students to the many educational pathways, experiences, and professionals that can prepare them for STEM degree programs and careers in New Jersey.

NEW JERSEY STEM
LEARNING ECOSYSTEMS
Delran STEM Ecosystem Alliance

Thank you!

Please Visit www.njstemecosystems.org

NEW JERSEY STEM
LEARNING ECOSYSTEMS

www.njstemecosystems.org